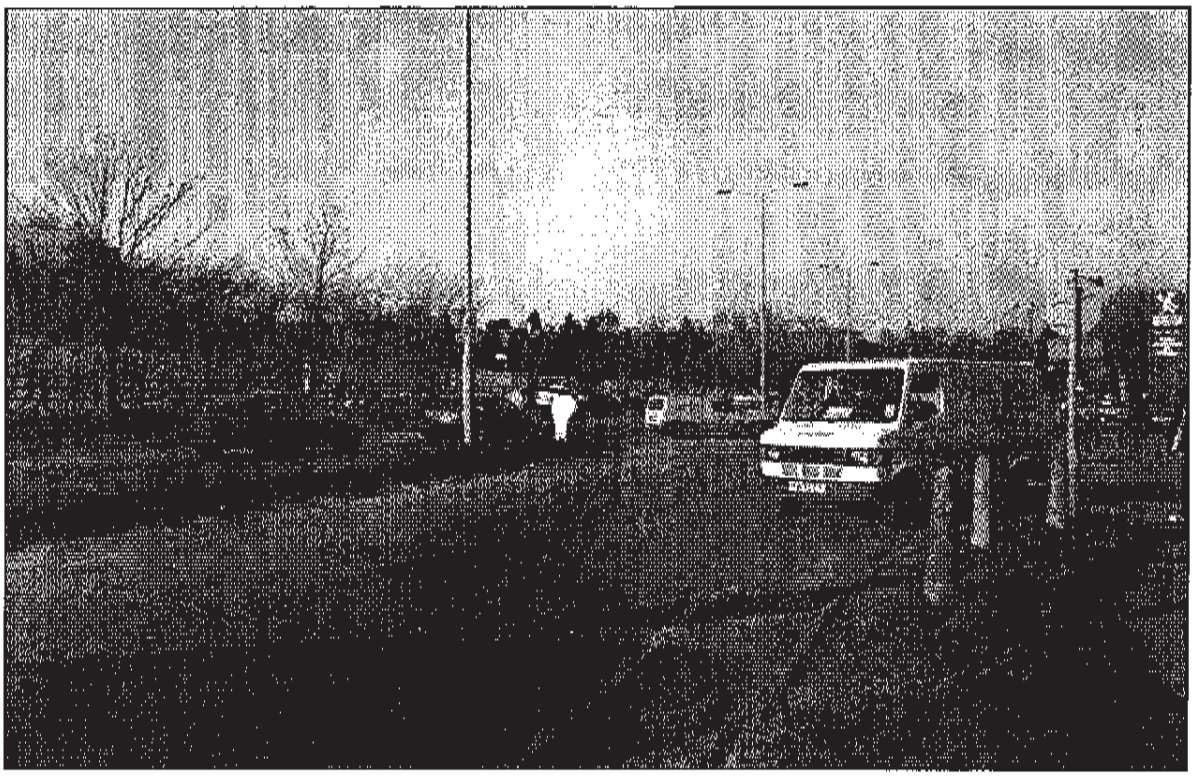
HIGHWAYS AGENCY

An Executive Agency of THE DEPARTMENT OF TRANSPORT

A23/M23 Hooley Junction Environmental Statement



Volume 2

Highways Agency Scheme ID A3/NEP/28

February 1998

Mott MacDonald

A23/M23 Hooley Junction

Environmental Statement

Highways Agency Scheme ID A3/NEP/28

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Volume 2

Doc Ref: 4423/HAS/WIN/002 Rev P2
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Highways Agency

A23/M23 Hooley Junction Improvement

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Volume 2: Environmental Statement

February 1998

Mott MacDonald
Easton Lane Compound
M3 Junction 9
Winchester
Hampshire
SO23 7TY

Highways Agency
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London Road
Dorking
Surrey
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Volume 2: Environmental Statement

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Issue and Revision Record

Rev	Date	Originator	Checked	Approved	Description
P1	Dec 1997	J Fisher	C Walker	C Walker	Preliminary Draft
P2	Feb 1997	J Fisher	C Walker	C Walker	Draft

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CONTENTS (cont)

PART 1: CULTURAL HERITAGE

CULTURAL HERITAGE

1 Walkover Survey on 17 February 1995

The whole of the area outlined on plan 92114/003 in Appendix 4 was carefully walked over on 17 February 1995. This work did not reveal any new information of direct archaeological interest, but it did provide valuable information on recent land use and the suitability of different areas for any further archaeological fieldwork. The distinct areas are marked by letter codes on **Figure 1.1**: some residual pieces of land of narrow extent and/or obviously badly disturbed by recent landscaping are separately indicated as unsuitable for any further archaeological investigation by reason of these facts. The lettered parcels of land as shown in **Figure 1.1** are as follows, the title of each site is given in paragraph 4.6:

A Site of SMR number 3745 - As described above, a well-defined cutting but note that there are many small (approximately 3 to 7 m high) trees growing within it, On the eastern side, spoil from the motorway construction spills over the sides of the cutting.

B This is scrub land, with occasional small trees, open and accessible for further fieldwork.

C Area covered with closely spaced, small (approximately 1.5 m high) fruit trees. Fieldwork would be impossible with this ground cover, but the trees would be easily removed by machine if archaeological investigation was required.

D A small grass-covered, area, sloping steeply to the south. It seems probable that this has been heavily landscaped, and is useless for further archaeological investigation.

E This is a grass field, but it has evidently been much disturbed in the recent past. It was a compound during motorway construction and a gas pipeline was diverted into the field for the construction of the M23. Topsoil has been removed and piled in low mounds, and there is much surface standing water, and evidence of the passage of heavy vehicles. At F, rubbish tipping has been taking place. Despite all this, it would be unwise to assume that archaeological remains (if such exist) have been damaged or destroyed beyond recovery of useful information. This is especially so on the higher ground towards the south (on fin 1), which seems the most likely location for a barrow (SMR 1067) and is also apparently less disturbed than elsewhere.

F See above under F.

G This is a sizeable area of fairly level ground. It is covered with small (approximately 5 m high) trees at 7 to 10 m intervals, and there is evidence of many similar trees in between having been cut at ground level in the past 1 to 2 years. Removal of the trees and stumps would almost certainly destroy any archaeological evidence present. Fieldwork (trial trenching) would just about be practical in its present condition, but the stumps may be a problem.

H Large quantities of dumped soil here would render fieldwork impossible. Even if removed it seems likely that the area below has been badly disturbed.

I Grassland with a few trees, not apparently previously disturbed, suitable for fieldwork.

J,K These are pasture fields, both of which slope gently to the south-east or east. Suitable for fieldwork. The northern part of the field has been disturbed by the laying of a gas pipeline. It was diverted into this area during the construction of the M23.

Figure 1.2 Extract from the Rocque map of 1768

Figure 1.3 Extract from the Tithe map of 1840

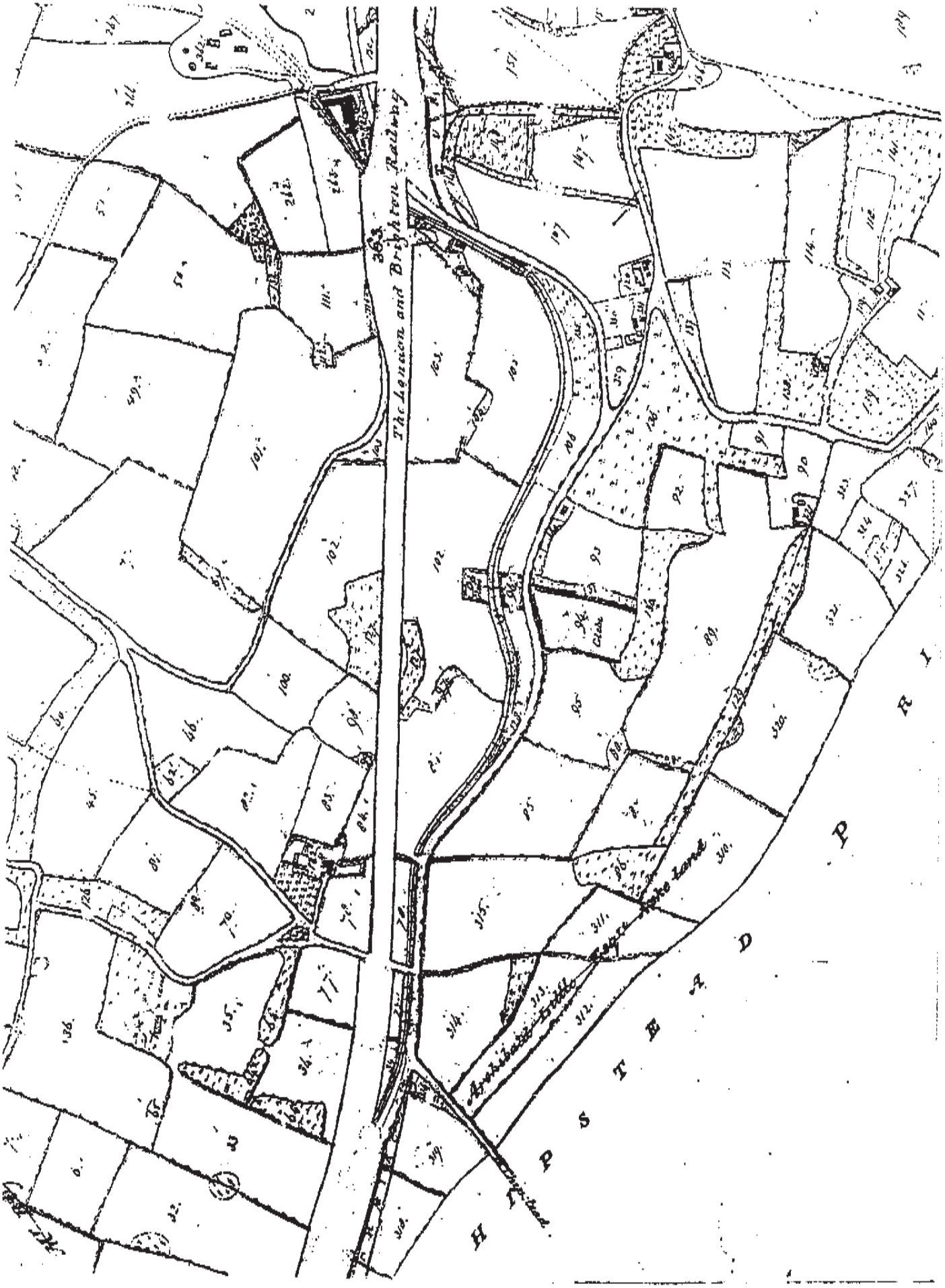
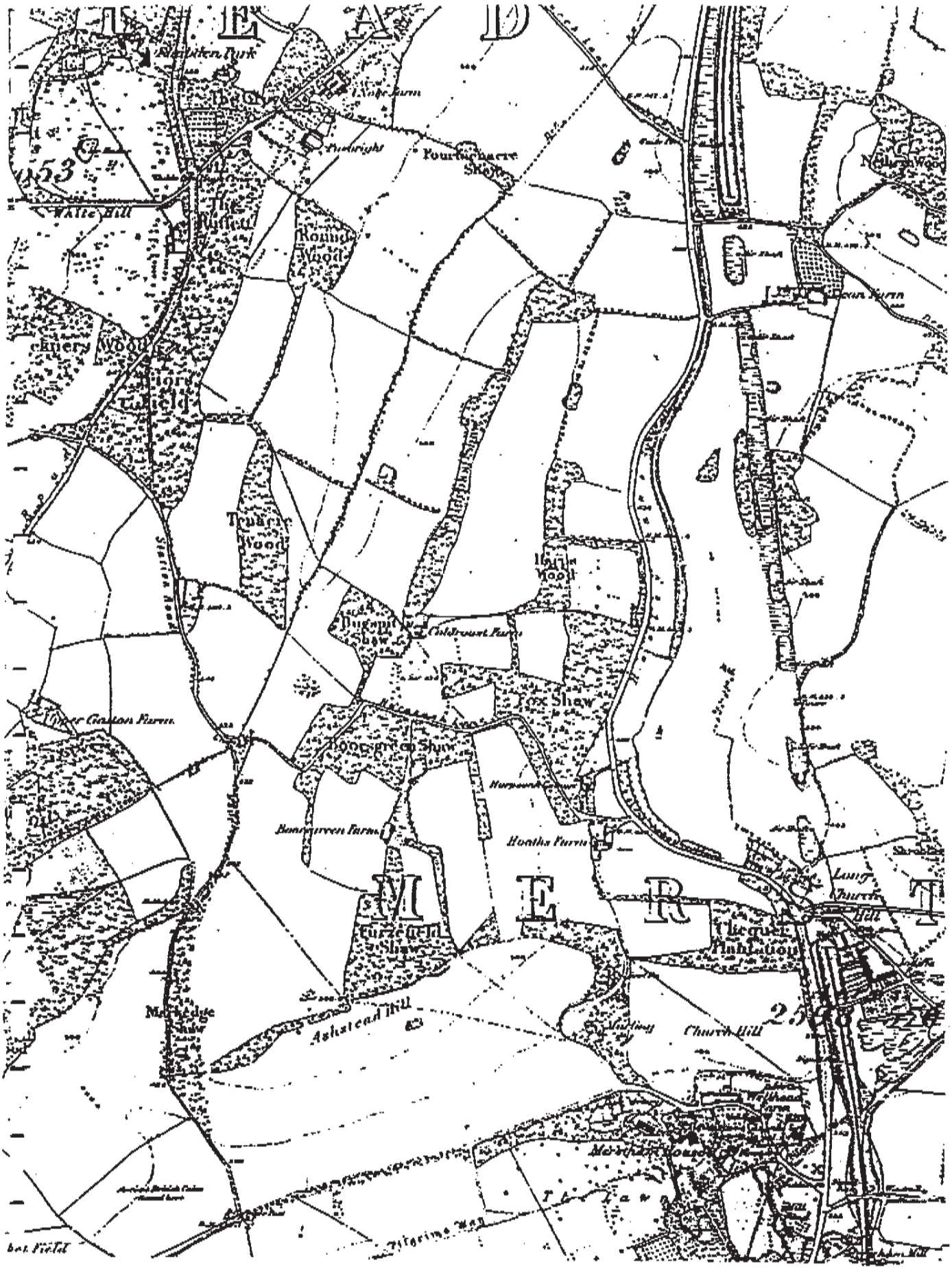


Figure 1.4 Extract from the 1st edition Ordnance Survey map of 1871



PART 2: ECOLOGY AND NATURE CONSERVATION

PLANT SPECIES

Acer campestre
Acer pseudoplatanus
Achillea millefolium
Aegopodium podagraria
Agrimonia eupatoria
Anagallis arvensis
Arctium minus
Armoracia rusticana
Arrhenatherum elatius
Artemesia vulgaris
Arum maculatum
Atriplex hastata
Betula pubescens
Blackstonia perfoliata
Brassica rapa
Bryonia dioica
Buddleja davidii
Calystegia sepium
Carduus nutans
Carpinus betulinus
Centaurea nigra
Centaurium erythraea
Cerastium arvense
Chaerophylum temulentum
Chamerion angustifolium
Chara sp.
Chenopodium album
Chenopodium polyspermum
Cirsium arvense
Cirsium palustre
Cirsium vulgare
Clematis vitalba
Clinopodium vulgare
Conium maculatum
Convolvulus arvensis
Cornus sanguinea
Corylus avellana
Cotoneaster sp.
Crataegus monogyna
Crepis biennis
Crepis capillaris
Dactylis glomerata
Daucus carota
Dipsacus fullonum
Dryopteris filis-mas
Epilobium hirsutum
Epilobium montanum
Equisetum telmateia
Erigeron acer
Euonymus europaeus
Euphrasia sp.
Fagus sylvatica
Fallopia japonica
Fraxinus excelsior
Galega officinalis
Geranium dissectum
Geranium molle
Geranium robertianum
Glechoma hederacea
Hedera helix
Heracleum sphondylium
Hieracium sp.
Holcus lanatus
Hypericum hirsutum
Hypericum montanum
Hypericum perforatum
Hypochaeris maculata
Hypochaeris radicata
Juncus articulatus.
Juncus inflexus
Juncus effusus
Knautia arvensis
Larix sp.
Lathyrus sylvestris
Leontodon hispidus
Leucanthemum vulgare
Linaria purpurea
Linaria vulgaris
Lotus corniculatus
Malus domestica
Malva sylvestris
Matricaria matricarioides
Medicago lupulina
Mentha aquatica
Mercurialis perennis
Myosotis arvensis
Odontites verna
Oenothera sp.
Oreganum vulgare
Papaver rhoeas
Pastinaca sativa
Phleum pratense
Picris echioides
Plantago lanceolata
Plantago media
Polygonum maculosa
Populus sp.
Potentilla anserina
Potentilla sterilis
Primula vulgaris
Prunella vulgaris
Prunus avium
Prunus sp.
Prunus spinosa
Pulicaria dysenterica
Quercus robur
Ranunculus acris
Ranunculus repens
Reseda lutea
Reseda luteola
Rhamnus cathartica
Rosa spp.
Rubus fruticosus agg.
Rumex acetosa
Rumex crispus
Rumex obtusifolius
Salix cinerea
Salix fragilis
Sambucus niger
Scrophularia nodosa
Senecio jacobea
Silene alba
Silene dioica
Silene vulgaris
Sisymbrium officinale
Solidago virgaurea
Sonchus arvensis
Sonchus asper
Sorbus aria
Stachys sylvatica
Symphoricarpos albus
Tamus communis
Tanacetum vulgare
Taraxacum officinale
Thymus polytricus
Torilis japonica
Trifolium pratense
Trifolium pratense
Trifolium repens
Tussilago farfara
Typha latifolia
Ulex europaeus
Ulmus sp.
Urtica dioica
Veronica chamaedrys
Vicia hirsuta

PART 3: LANDSCAPE EFFECTS

VISUAL INTRUSION SCHEDULES

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
1	Fairlam, Dean Lane	semi-detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
2	26 Dean Lane	semi-detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
3	Clover, Netherne Lane	detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
4	Woodside cattery, Netherne Lane	detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
5	Fircroft, Dean Lane	detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
6	High Trees, Dean Lane	detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
7	Lavender Cottage, Dean Lane	semi	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.
8	28 Dean Lane	semi	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the 'dead' section of the M23 motorway. This would reduce as planting matured.

	-	neutral (see text for discussion)
	a	adverse impact
	b	beneficial impact
4423\RLB\DI\A	Nc	no change in conditions
EWR\A23-Feb98\wp	N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
9	Little Chef, Hooley	restaurant	urban fringe	NA	Nc			Nc			located on the A23 at Dean Lane. Proposed works would not be visible from here.
10	117 London Road North	detached	urban fringe	NA	Nc			Nc			located along London Road but proposal would not be visible. These properties are located along the existing A23 carriageway.
11	119 London Road North	detached	urban fringe	NA	Nc			Nc			located along London Road but proposal would not be visible. These properties are located along the existing A23 carriageway.
12	121 London Road North	detached	urban fringe	NA	Nc			Nc			located along London Road but proposal would not be visible. These properties are located along the existing A23 carriageway.
13	123 London Road North	detached	urban fringe	NA	a			Nc			visual effect would be limited to distant views of vehicles over the bridge and of the cutting for the loop. These properties already overlook the A23 carriageway.
14	125 London Road North	detached	urban fringe	280 m	a			Nc			visual effect would be limited to distant views of vehicles over the bridge and of the cutting for the loop. These properties already overlook the A23 carriageway.
15	127 London Road North	detached	urban fringe	260 m	a			Nc			visual effect would be limited to distant views of vehicles over the bridge and of the cutting for the loop. These properties already overlook the A23 carriageway.
16	129 London Road North	detached	urban fringe	240 m	a			Nc			visual effect would be limited to distant views of vehicles over the bridge and of the cutting for the loop. These properties already overlook the A23 carriageway.
17	131 London Road North	detached	urban fringe	220 m	a			Nc			visual effect would be limited to distant views of vehicles over the bridge and of the cutting for the loop. These properties already overlook the A23 carriageway.

* neutral (see text for discussion)
a adverse impact
b beneficial impact
Nc no change in conditions
N/A not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
18	Oldfields, London Road North	detached	urban fringe	150 m	a			Nc			views of cutting slope for the loop and of vehicles on the unused bridge. This would reduce as planting matures properties currently have views to A23.
19	Okewood, London Road North	detached	urban fringe	120 m	a			Nc			views of cutting slope for the loop and of vehicles on the unused bridge. This would reduce as planting matures properties amenity have views to A23.
20	Dean Farm, London Road North	detached	urban fringe	NA	a			Nc			distant views of cutting for loop and of vehicles using the dead section of the M23 motorway. This would reduce as planting matured.
21	Northdown House, Glebe Road	detached	urban fringe	120 m		a		b			would have views across fields to the new cutting for the loop. This would reduce as planting matures. Also views of vehicles on unused motorway.
22	Merrow, Glebe Road	detached	urban fringe	120 m		a		b			would have views across fields to the new cutting for the loop. This would reduce as planting matures. Also views of vehicles on unused motorway.
23	Arley, Glebe Road	detached	urban fringe	120 m		a		b			would have views across fields to the new cutting for the loop. This would reduce as planting matures. Also views of vehicles on unused motorway.
24	Bourne Cottage, Glebe Road	detached	urban fringe	120 m		a		b			would have views across fields to the new cutting for the loop. This would reduce as planting matures. Also views of vehicles on unused motorway.
25	Little Orchard, London Road North	detached	urban fringe	150 m	a			Nc			views of vehicles on the unused section of the motorway. This would reduce as landscape planting matures.
26	Wentwood, London Road North	detached	urban fringe	150 m	a			Nc			views of vehicles on the unused section of the motorway. This would reduce as landscape planting matures.

	*	neutral (see text for discussion)
	a	adverse impact
	b	beneficial impact
44231RLB1401\A	Nc	no change in conditions
EWR\A23-Feb98\wp	N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
27	The Glebe House, London Road North	detached	urban fringe	150 m	a			Nc			views of vehicles on the unused section of the motorway. This would reduce as landscape planting matures.
28	Bankside, London Road North	detached	urban fringe	150 m	a			Nc			views of vehicles on the unused section of the motorway. This would reduce as landscape planting matures.
29	168 London Road North	detached	urban fringe	24/150 m		a		Nc			loss of vegetation in the central reservation would open up views to the existing A23/M23 junction infrastructure. This would be reduced as new tree and shrub planting matures.
30	170 London Road North	detached	urban fringe	10 m		a		Nc			loss of vegetation in the central reservation would open up views to the existing A23/M23 junction infrastructure. This would be reduced as new tree and shrub planting matures.
31	Cranston House, Harps Oak Lane	detached	urban fringe	70 m		a		b			loss of some trees and shrubs along boundary of property and the addition of the service road will increase visual intrusion of A23 northbound. This will be reduced as new planting matures.
32	Hoaths Farm Cottages, Harps Oak Lane	semi-detached	urban fringe	NA	Nc			Nc			
33	Hoath Cottages, Harps Oak Lane	semi-detached	urban fringe	NA	Nc			Nc			
34	Hoaths Farm House, Harps Oak Lane	detached	urban fringe	NA	Nc			Nc			
35	Stone Barn, Harps Oak Lane	semi-detached	urban fringe	NA	Nc			Nc			
36	Timber Barn, Harps Oak Lane	semi-detached	urban fringe	NA	Nc			Nc			
37	185 London Road North	detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.

	+	neutral (see text for discussion)
	-	adverse impact
	b	beneficial impact
44231RL01\01\A EWR\A23-Feb98\wp	Nc	no change in conditions
	N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
38	187 London Road North	detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
39	189 London Road North	detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
40	191 London Road North	detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
41	193 London Road North	detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
42	195 London Road North	semi-detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
43	197 London Road North	semi-detached	urban fringe	NA	a			Nc			views from the back of properties will be affected by work on cutting slope for M23 northbound slip. The ridge line will be reduced.
44	186 London Road North	detached	urban fringe	NA	Nc			Nc			
45	188 London Road North	detached	urban fringe	NA	Nc			Nc			
46	190 London Road North	detached	urban fringe	NA	Nc			Nc			
47	192 London Road North	detached	urban fringe	NA	Nc			Nc			
48	194 London Road North	detached	urban fringe	NA	Nc			Nc			
49	199 London Road North	detached	urban fringe	NA	Nc			Nc			

*	neural (see text for discussion)
a	adverse impact
b	beneficial impact
Nc	no change in conditions
N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
50	201 London Road North	detached	urban fringe	NA	Nc			Nc			
51	203 London Road North	terraced	urban fringe	NA	Nc			Nc			
52	205 London Road North	terraced	urban fringe	NA	Nc			Nc			
53	207 London Road North	terraced	urban fringe	NA	Nc			Nc			
54	209 London Road North	terraced	urban fringe	NA	Nc			Nc			
55	211 London Road North	detached	urban fringe	NA	Nc			Nc			
56	213 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
57	215 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
58	217 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
59	219 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
60	221 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
61	223 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
62	225 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
63	227 London Road North	semi-detached	urban fringe	NA	Nc			Nc			
64	229 London Road North	detached	urban fringe	NA	Nc			Nc			
65	Field Cottage, Church Hill	detached	urban fringe	300 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
66	North Point, Church Hill	detached	urban fringe	280 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.

-	neutral (see text for discussion)
a	adverse impact
b	beneficial impact
Nc	no change in conditions
N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
67	Shieling, Church Hill	detached	urban fringe	260 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
68	The Chase, Church Hill	detached	urban fringe	260 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
69	Lavenders, Church Hill	detached	urban fringe	240 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
70	Carrera, Church Hill	detached	urban fringe	220 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
71	Hoath Meadows, Church Hill	detached	urban fringe	320 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
72	Little Gattons, Church Hill	detached	urban fringe	310 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
73	Baddley House, Church Hill	detached	urban fringe	290 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
74	Melton House, Church Hill	detached	urban fringe	290 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
75	Cromwell Cottage, Church Hill	detached	urban fringe	290 m	a			Nc			may catch very distant views of vehicles on unused section of the motorway. This will reduce as screen planting matures.
76	1 Jolliffe Road	semi-detached	urban fringe	NA	Nc			b			distant views along motorway would improve as fly tipping and maintenance depot is replaced with the new carriageway and landscape mounds and planting although these are so distant and across the carriageway as to be Nc.

	*	neutral (see text for discussion)
	a	adverse impact
	b	beneficial impact
44231RL01V01\A	Nc	no change in conditions
EWR\A23-Feb98\wp	N/A	not applicable

Ref No	Location address	Building type	Context	Distance from centre line of road (m)	Junction						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
77	2 Jolliffe Road	semi-detached	urban fringe	NA	Nc			b			distant views along motorway would improve as fly tipping and maintenance depot is replaced with the new carriageway and landscape mounds and planting although these are so distant and across the carriageway as to be Nc.
78	3 Jolliffe Road	terraced	urban fringe	NA	Nc			b			distant views along motorway would improve as fly tipping and maintenance depot is replaced with the new carriageway and landscape mounds and planting although these are so distant and across the carriageway as to be Nc.
79	5 Jolliffe Road	terraced	urban fringe	NA	Nc			b			distant views along motorway would improve as fly tipping and maintenance depot is replaced with the new carriageway and landscape mounds and planting although these are so distant and across the carriageway as to be Nc.
80	6 Jolliffe Road	terraced	urban fringe	NA	Nc			b			distant views along motorway would improve as fly tipping and maintenance depot is replaced with the new carriageway and landscape mounds and planting although these are so distant and across the carriageway as to be Nc.
81	Little House, Shepherds Hill	detached	urban fringe	NA	a			Nc			distant views of the new cutting adjacent to the M23 northbound slip road. This will become less visible as it matures.
82	Timberlea, Shepherds Hill	detached	urban fringe	NA	a			Nc			distant views of the new cutting adjacent to the M23 northbound slip road. This will become less visible as it matures.
83	Rhydlanfair, Shepherds Hill	detached	urban fringe	NA	a			Nc			distant views of the new cutting adjacent to the M23 northbound slip road. This will become less visible as it matures.
84	Highfield, Beech Road	detached	urban fringe	NA	a			Nc			distant views of the new cutting adjacent to the M23 northbound slip road. This will become less visible as it matures.

-	neutral (see text for discussion)
a	adverse impact
b	beneficial impact
Nc	no change in conditions
N/A	not applicable

RIGHTS OF WAY

Ref No	Name of Right of Way	Type	Context	Distance from centre line of road (m)	Road						Comment
					Visual impact assessment						
					Opening year 1 (winter)			Design year 15 (summer)			
					Sl	M	Sb	Sl	M	Sb	
FP1	Footpath 100	Footpath	rural		a			a			Footpath would have views across the M23 motorway to the cutting slope of the M23 northbound slip and of vehicles on the unused section of the M23 motorway. This would be reduced as the cutting slope weathers and landscape planting matures.
	Footpath 600	Footpath	rural		Nc			Nc			
	Footpath 602	Footpath	rural		a			Nc			Slight adverse views of vehicles on the disused section of the motorway which would reduce as the landscape planting matures.

-	neutral (see text for discussion)
a	adverse impact
b	beneficial impact
Nc	no change in conditions
N/A	not applicable

PART 4: WATER QUALITY AND DRAINAGE

WATER QUALITY AND DRAINAGE

4.1 Introduction

4.1.1 Assessment

The assessment of water quality and drainage is described in Volume 1. The principles of the proposed highway drainage are described in detail below.

4.1.2 Pollutant Content

As stated in Volume 1, rain water falling on and running over the surface of a road can pick up and carry with it pollutants that have been deposited on the road surface.

The chemical nature of this run-off is highly variable, but potential pollutants are:

- suspended solids - mainly from mud, corrosion, metal particles, grit associated with de-icing salts, tyre organics, and road surface wear;
- lead - mainly from petrol (but in decreasing quantities as new cars with catalytic convertors replace those which can use leaded petrol);
- zinc and cadmium - mainly from the deterioration of the galvanised portions of vehicles, such as exhaust pipes and brake wear respectively;
- organics - as rubber, bitumen, grease, and oil (these may cause poly aromatic hydrocarbon (PAH) release);
- salt, as sodium and chloride ions (seasonal, and depends on de-icing);
- other alternative de-icing agents;
- products of mowings, leaves, soil erosion and animal excreta (periodic);
- iron - from corrosion (small quantities);
- anticaking agents from road salt (small quantities);
- nickel, chromium copper, bromine from salt impurities (trace quantities);
- herbicides and pesticides from roadside verge maintenance.

4.1.3 The Effect of Highway Runoff on Receiving Watercourses

There are no established watercourses in the area of the proposed works. Drainage is predominantly by infiltration. (See **Figure 4.1**).

4.1.4 The Effect of Highway Runoff on Groundwater

Pollution of groundwater is less immediately apparent than pollution of a surface watercourse. There are no immediate effects on fauna and flora and there is unlikely to be any public awareness or media interest.

Pollution of an aquifer may persist for a long time because of the time taken for the pollutant to percolate through the aquifer. A continuing polluting event may also remain unnoticed, thereby increasing the impact.

It is believed that the natural processes that break down pollutants in surface watercourses operate more slowly underground. The pollutants are more difficult to access once below the ground surface.

Abstraction of ground water for potable use often requires little treatment other than disinfection. Having to treat groundwater following a pollution incident may be impractical. In the longer term the aquifer may discharge to surface watercourse lower in the drainage basin leading to pollution of the stream's base flow.

As stated above runoff from highways is a potential threat to underground water resources. However in Britain there seems to be little evidence of pollution of groundwater from discharges from highway drainage taking place. Studies have investigated levels of chloride in abstracted water near to motorways. Increased levels of chloride due to routine application were not recorded although there has been a case of a public water supply affected by salt from a maintenance depot's salt store.

Pollution from accidental spillages and hydrocarbons washed off the road have been thought to have contributed to increased levels of pollutants at abstraction points. However the studies have not always been able to determine, with confidence, the source of the pollution.

Highways run-off can be of benefit to groundwater in providing a source of recharge where water table levels are falling. This particular scheme is relatively minor in terms of area and is unlikely to alter the current situation significantly.

4.1.5 Mitigation

The effect of highway run-off on receiving waters can be mitigated by incorporating the following features in the proposed drainage system:

(i) grit/silt traps;

(ii) oil interceptors; *

(iii) French drains;

(iv) sedimentation tanks/lagoons;

(v) grass swales;

(vi) aquatic/vegetative systems;

(vii) pollution traps. *

Those measures that are of particular benefit to groundwater protection are marked with an asterisk.

4.2 Flooding

4.2.1 Flooding of the Hooley Junction

There is no history of flooding in the area under consideration.

4.3 Proposed Drainage Principles

4.3.1 Route Option

The proposed drainage provision for the new slip roads, service road and re-aligned main carriageway is described below. (**See Figure 5.20, Volume 1**)

4.3.2 Collection of Surface Run-Off

Carriageway run off would be collected at the road edge by half-batter precast concrete kerb and road gullies. Road gullies would have sumps and be trapped. In cuttings run-off from

side slopes would be collected in precast channel blocks discharging to carrier pipes serving the road gullies.

Run-off from adjacent higher land would be intercepted by "cut off" ditches where necessary. These ditches would discharge to the carrier pipe network. Ditches would be lined where gradients exceed 1 in 100.

4.3.3 Carrier Pipes

In order to reduce construction costs chambers would be the catchpit type. However, removal of settled sediment would not be carried out regularly. Instead reliance for removal of suspended solids would be placed on the road gullies which would be emptied to normal maintenance standards. In order to minimise construction costs the contractor would be allowed to choose from a wide range of possible materials including twin walled plastic pipes. Similarly in order to reduce the number of chambers, carrier pipes would be laid at large radius curves where appropriate. In such cases the maximum spacing of chambers would be 100 m.

Carrier pipes would have a minimum dimension of 225 mm diameter. Road gully connections would be 150 mm diameter.

It is intended that pipe sizes would be designed to accommodate a 1 in 1 year storm without surcharging and to accommodate a 1 in 5 year storm without flooding. Rainfall intensities would be determined in accordance with the Wallingford Procedure.

4.3.4 Soakaways

It is intended that all flow from new carriageways would be discharged on the following basis. Where possible existing systems will be utilised. Elsewhere new soakaways will be provided and designed to Building Research Establishment Digest 365.

New Soakaways will incorporate a number of pollution control features:

- Bypass Interceptor/Containment - Flow would initially be directed to a bypass interceptor to remove hydrocarbons. The separators would be sized on the basis of area of catchment subject to a minimum capacity of 20 000 l in order to contain accidental spillage. This provision would be subject to Environment Agency agreement. If separate containment was considered necessary the bypass interceptor would then be sized by catchment area alone and a separate downstream containment facility provided. It is most likely that this would be achieved by oversizing of pipes. In either case a control valve would be provided so that the flow could be stopped to

contain the spilled material for removal by tanker. A high level overflow would allow follow-on flows to bypass the containment facility while tankering is arranged.

- Access and Safety - Good vehicular access to interceptors is essential. Regular removal of accumulated silt and hydrocarbons would require access by a tanker.

4.4 Risk of Accidental Spillages

An assessment of the risk of accidental spillages was carried out using the method described in the Design Manual for Road and Bridges Vol 11 Section 3 Chapter 4 (DMRB). The method applies to the average accident rate of 0.47×10^{-6} HGV accidents per vehicle km to the particular length of road under study. The full equation is as follows:

No of Accidents including a HGV carrying hazardous material =
AADT x 365 x % of HGV's x 0.1 x 0.47×10^{-6} x RL

AADT = Annual Average Daily Traffic (worst year in first fifteen high growth)

RL = Road Length

In this case there are two values of RL:

RL north loop	=	1.1 km
RL M23 to A23 off slip	=	0.25 km

AADT has been determined from traffic surveys.

The DMRB method assumes 1 in 10 HGV carries a hazardous load and further suggests that only one accident in 10 would lead to a spillage of hazardous material.

On this basis and using flows from the Traffic Forecasts and Economic Appraisal Report (TFEA) the following figures are obtained:

North Loop

At year 2000 0.00XX spillages/year*
At year 2015 0.00XX spillages/year*

M23/A23 Off Slip

At year 2000 0.00XX spillages/year*
At year 2015 0.00XX spillages/year*

The figures produced by the method are low mainly because of the relatively short lengths of road under consideration and the low traffic flows. A figure of 0.00XX spillages/year could alternatively be represented by a figure of 1 spillage in XXX years. The risk of a spillage on the new roads would therefore be very low.

Assessment of the likely consequences of a major spill, take into account:

- the design of the drainage system, and its effectiveness at delaying or containing pollutants, so that interception and treatment can be carried out, if required;
- procedures for preventing pollutants leaving the road surface;
- procedures for closing down the drainage system before any pollutants have passed through it to receiving waters;
- procedures for cleaning up a spillage;
- the proximity of water abstraction.

* Values to be inserted on completion of revised traffic model

4.5 Ground Water

The soil survey report recorded ground water at only one location above the existing "dead" section of motorway. It is believed ground water is typically found at XX m depth.

It is intended that the new discharges to soakaways will be protected by interceptors and provision for closing the system in the event of accidental spillages. The risk of additional spillages following completion of the scheme is considered very low.

The likely effect of the proposed works on groundwater flow are considered to be insignificant due to the depth of the water table.

The proposals do involve disturbance of made ground. Some of the water from such material may be polluted. Disturbance of the material will increase the likelihood of contaminated water reaching the surrounding groundwater. Additional Site investigation will be carried out to determine the likely level of contamination.

4.6 References

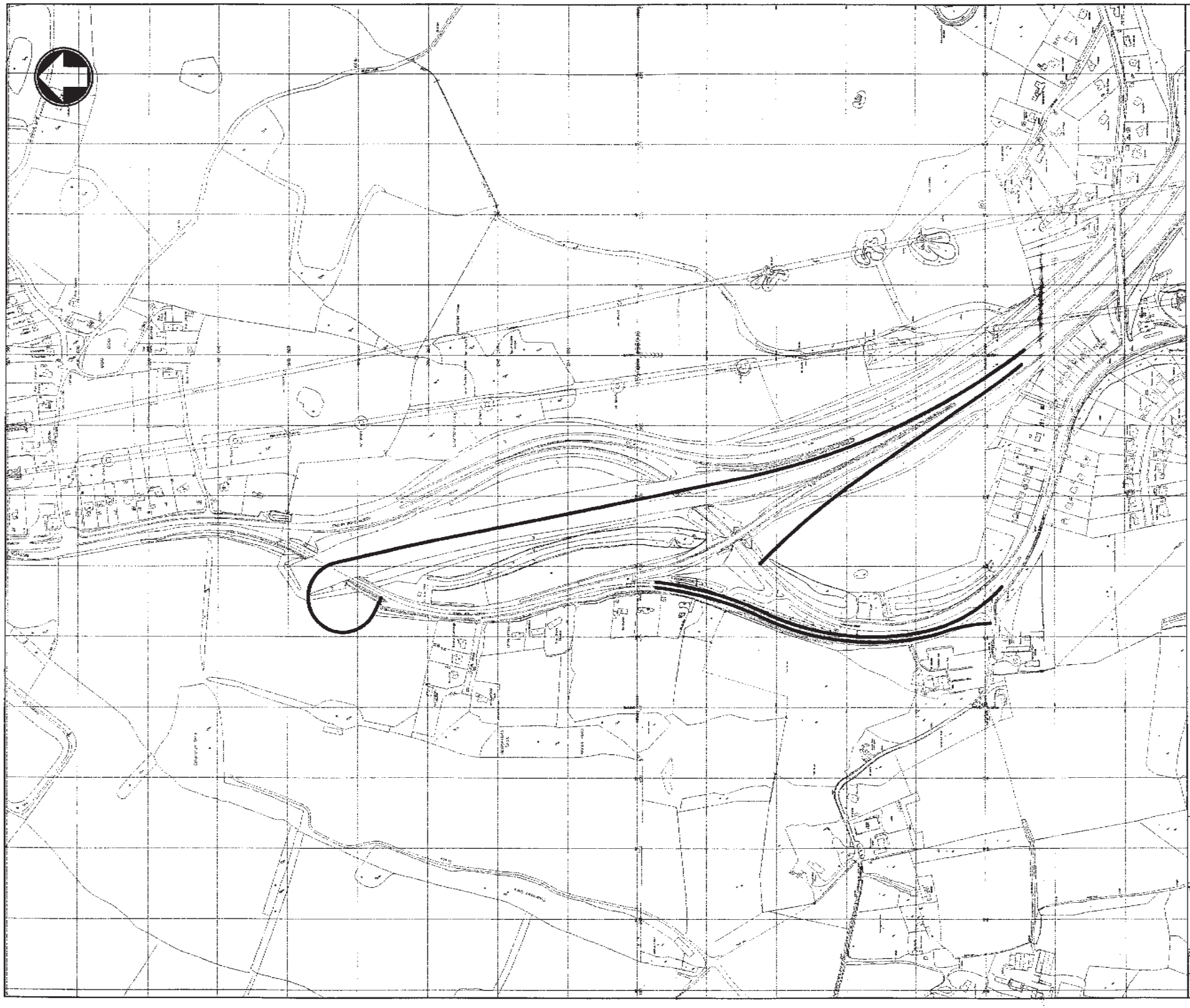
1 Design Manual for Roads and Bridges, Volume 11
Environmental Assessment - The Department of Transport - 1993

2 Traffic Forecasts and Economic Appraisal - Mott MacDonald - 1998

3 A23/M23 Hooley Factual Report on Ground Investigation - Exploration Associates Ltd 1995.

4 Design and Analysis of Urban Storm Drainage - The Wallingford Procedure - Hydraulics Research Ltd

5 Control of Pollution from Highway Drainage Discharges - CIRIA Report 142 - 1994.



KEY

AQUIFER PROTECTION ZONE

CENTRE LINES OF PROPOSED WORKS

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Title

A23/M23 HOOLEY JUNCTION IMPROVEMENT
WATER QUALITY AND DRAINAGE - EXISTING

Date	Drawn	Checked	Approved	Scale
Jan 1998	CAD	CHW	CHW	1:5000

Drawing No.

Figure 4.1

Rev.

P2

PART 5: POLICIES AND PLANS

TABLE 5.1

Policy Assessment Schedules: Surrey County Council

Table 5.1		Policy	Impact of Scheme on Policy Objectives	
Origin	Ref No	Surrey County Council Structure Plan, Replacement Plan (1994)	Assessment	Comments
SCC	PE1	This policy defines the extent of the Metropolitan Green Belt	0	The Scheme lies within the area of the Metropolitan Green Belt
SCC	PE2	Within the Green Belt and outside rural settlements, development which would conflict with the purposes of the Green Belt or adversely affect its open character will not be permitted, except in very special circumstances.	-1	The proposals are not essential requirements for agriculture or forestry and would not normally be permitted within the Green Belt. However, the scheme is relatively minor additions and improvements to the existing road infrastructure to improve road safety.
SCC	EN2	Development which may have a materially adverse impact upon the environment and character of the County, or make material demands on infrastructure and services, will not be permitted unless it has been demonstrated by the provision of appropriate information, that environmental effects are acceptable and conform with the policies of this Plan and the relevant local plan	+1	The junction improvements options proposed for the A23/M23 junction are subject to the process of environmental assessment according to the guidelines for environmental assessment in the Department of Transport's Design Manual for Roads and Bridges, Volume 11. A full ES will be produced. The purpose of this document is to assess the environmental effects of the scheme. In addition, this document will assess in detail whether the scheme conforms with the policies of the SCC structure plan and R&BBC local plan (Volume 1, Section 5.13 and Volume 2, part 6).
SCC	PE7	The planning authorities will protect landscape in the County by conserving landscape quality and promoting the maintenance of landscape diversity and the enhancement of local landscape distinctiveness. This policy specifies that Areas of Outstanding Natural Beauty (AONB), *will be subject to the most rigorous protection* and Areas of Great Landscape Value (AGLV) are subject to the same considerations as AONB. In addition, the policy states that for Damaged Landscapes, 'particularly land within the urban fringes around towns, adjoining motorways or primary routes' permissible development in such areas will be expected to make a positive contribution to improving the quality and appearance of the landscape.	0 +2	The scheme area lies within the AONB and AGLV. The proposals include improvements to the unused section of the M23 motorway which, although not designated a damaged landscape in the RBBC local plan, is disturbed ground that has been used for dumping of waste materials and is unsightly. Additional cut and embankment required for the provision of the link roads would have a disturbing effect on adjacent landscapes, However a full mitigation package is included in the proposals.
SCC	PE8	Areas of nature conservation value will be protected and enhanced. In both urban and rural areas, development proposals will be expected to create new areas of nature conservation value.	+2	There are no nationally or locally designated sites of nature conservation importance in the vicinity of the A23/M23 junction. An ecological assessment has been undertaken to determine the nature conservation value of the areas affected by the scheme options. The proposals include a mitigation package.

Table 5.1		Policy	Impact of Scheme on Policy Objectives	
Origin	Ref No	Surrey County Council Structure Plan, Replacement Plan (1994)	Assessment	Comments
SCC	PE9	Trees, hedgerows and woodlands, particularly ancient semi-natural woodlands, will be conserved and their management promoted. The planning authorities will seek to ensure that the extent of tree cover in the County is maintained.	+2	The existing service road at Glebe Road would be extended to the junction with Harps Oak Lane. The A23 northbound carriageway has been realigned to avoid damage to Fox Shaw woodland, although trees in the central reservation will be lost to facilitate this. The proposals include establishment of hedges and dense planting of trees and shrubs.
SCC	PE12	Surrey's valuable inheritance of buildings, sites and historic landscape will be conserved and enhanced Local Plans will identify landscaped parks and gardens, other areas of archaeological or historic value, ancient monuments and County Sites of Archaeological Importance. Development will not normally be permitted which would have a materially adverse impact on such buildings or sites.	-1	The earthworks of Surrey Iron Railway (SAM Surrey 123) lie in close proximity to the proposed works. The works will have some impact on the setting of the Ancient Monument. Two other archaeological areas are affected by the proposed works.
SCC	PE13	An adequate record will be required to be made where development affecting buildings, parks and gardens, sites or areas referred to in Policy PE12 is permitted..... Archaeological assessment or evaluation will also be required prior to development on sites of 0. 4 hectares or more. Where archaeological remains cannot be preserved in situ, proper archaeological investigation will be required prior to development.	+2	A Stage 2 archaeological assessment has already been undertaken for the area affected by the scheme proposals and outlines recommendations, constraints and areas where other investigation would be required. Two archaeological sites will be affected by the works. Mitigation proposed include a watching brief for one area not listed in the SMR. SMR site 1067 will undergo additional investigation prior to the proposed scheme.
SCC	MT1	The local authorities will use all appropriate measures to manage and control the demand for travel by car.....in order to secure environmental improvements, to improve safety and to reduce traffic congestion and pollution.	+2	The provision of a link road dedicated specifically to A23/M23 U-turning movements would benefit residents in the Dean Lane junction area in terms of safety and congestion. The results of the traffic models do not suggest that the improvements will attract a significant number of additional movements into the area.
SCC	MT9	The County Council will support a Motorway and Primary Route Network that contains routes of national or regional significance. The County Council will seek to maintain and improve roads in this network to a standard appropriate to their function.	+2	In Surrey, these roads include the M23 and A23(T) between the M23 and boundary with the London Borough of Croydon. The current A23/M23 junction is not at the standard that would normally be provided for such an important junction. The proposals would considerably improve this junction.
SCC	MT10	In the selection and programming of major highway schemes, the County Council will give priority to those schemes which solve or ameliorate existing problems and give significant economic and environmental benefit.	+2	The proposals will improve road safety

Table 5.1		Policy	Impact of Scheme on Policy Objectives	
Origin	Ref No	Surrey County Council Structure Plan, Replacement Plan (1994)	Assessment	Comments
SCC	MT17	The local authorities will promote measures which assist the safe movement of cyclists by seeking to reduce the conflict between cyclists and motor vehicles, particularly where accidents are prevalent, provide segregated access and cycle networks.	+2	The proposals include provision for cyclists.
SCC	DP4	This policy states housing provision in the County between 1991 and 2006 and beyond.	0	The proximity of the Netherne Hospital development site may be of significance for future trip generation affecting the Dean Lane junction with the A23.
SCC	DP5	Local Plans will identify, where appropriate, the release of land allocated for housing, having regard to:..... ii) the availability of infrastructure and services needed to cater to the demands which are generated	+1	As above.

TABLE 5.2

Policy Assessment Schedules: Reigate and Banstead Borough Council

Table 5.2		Policy	Impact of Scheme on Policy Objectives	
Origin	Ref No	Reigate & Banstead Borough Council Local Plan - (1994)	Assessment	Comments
RBBC	CO1	A Green Belt will be maintained as shown on the Proposals Map, and the Borough Council will not normally permit development, except for the essential requirements of agriculture or forestry, and any permissions granted will include conditions designed to restrict the use to that purpose for which it was permitted	-1	The A23/M23 junction is located within the Green Belt. The proposals are not essential requirements of agriculture or forestry and would therefore not normally be permitted by the Borough Council. However the proposals include amendments and additions to the existing junction which, in the context of this area, has only minor effect on the Green Belt.
RBBC	HO10	Development will not normally be permitted in areas subject to noise and for vibration unless measures are undertaken as part of such development to reduce to an acceptable level the effect of such noise and for vibration upon the intended occupiers of such development	0	The noise assessment indicates that no change in noise levels would result to the residential properties in the area (Volume 1, Section 5.8).
RBBC	PC1	The Surrey Hills AONB and the AGLV will be protected from inappropriate development. Major proposals for development within these areas would normally be inconsistent with the aims of designation. To aid proper consideration these must be accompanied by an appropriate appraisal of their environmental impact. Where proposals are made by statutory undertakers, the Borough Council will ensure that the interests of visual amenity are a key consideration in siting and design.	0	A landscape appraisal has been undertaken and is included in this report.
RBBC	PC3	The Borough Council will seek to retain the Ancient Woodland sites, and will encourage the positive management of such sites in the interest of nature conservation	0	The A23 northbound carriageway will be realigned to protect the integrity of the Fox Shaw Ancient Woodland.
RBBC	PC4	The Borough Council will protect, conserve and enhance the tree cover in the Borough through the use of development control powers, its own resources where available, and by the making of Tree Preservation Orders. The Council will actually promote a larger extent of woodland by the encouragement of planting. There will be a general presumption in favour of the planting of broadleaved species. The proposals include dense tree and shrub planting of broadleaved species.	+2	Two areas of woodland within the cutting of the Surrey Iron Railway have been covered by TPO. These areas will be retained.

Table 5.2

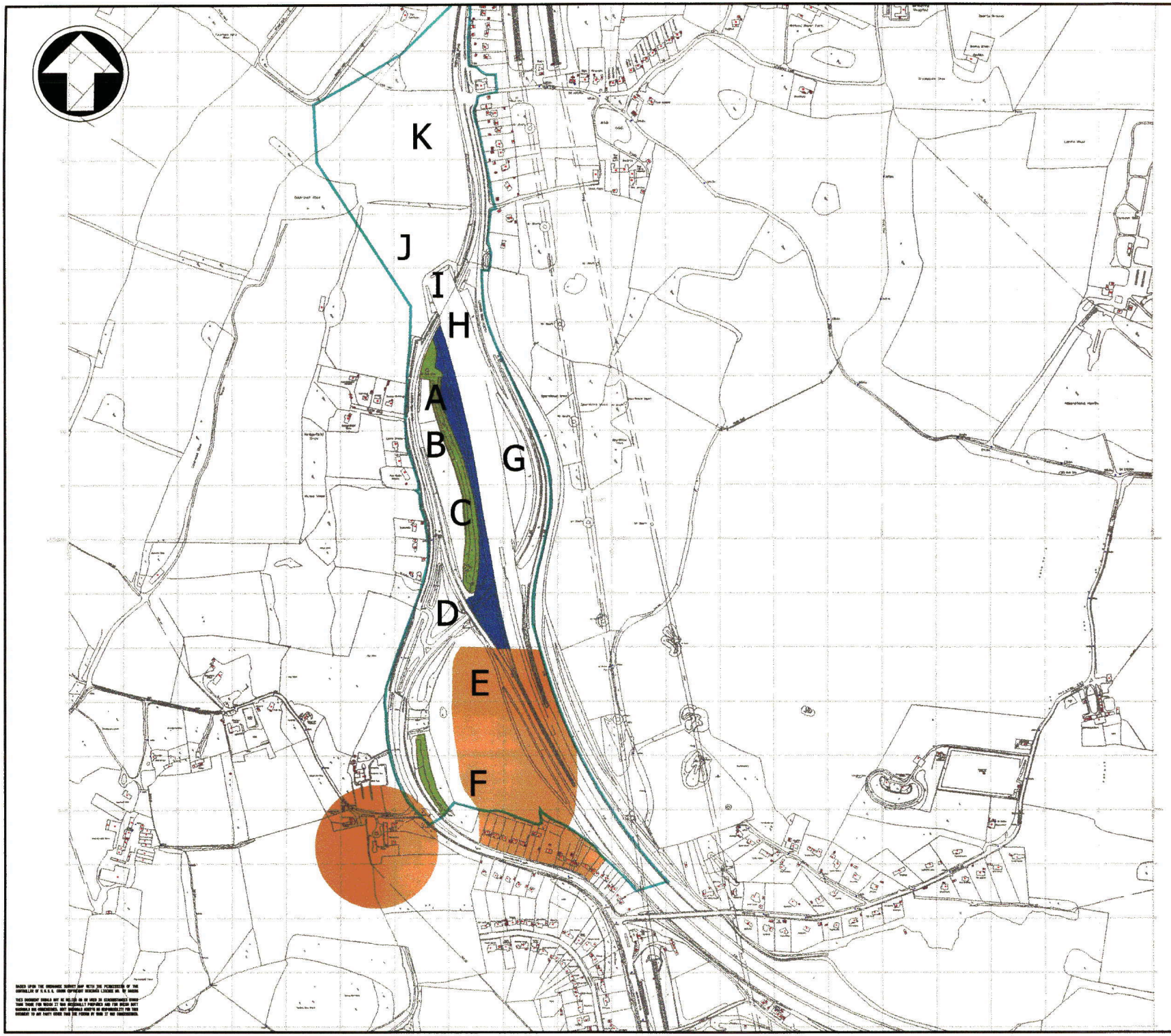
Origin	Ref No	Policy	Impact of Scheme on Policy Objectives	
		Reigate & Banstead Borough Council Local Plan - (1994)	Assessment	Comments
RBBC	PC8	Scheduled Ancient Monument and County Sites of Archaeological Importance will be protected. Where large-scale developments occur outside known Areas of High Archaeological Potential, the Borough Council will require an Archaeological Assessment to be submitted, together with the planning application, and may require an agreed scheme for investigation, monitoring and recording.	-1	Archaeological assessment has been undertaken and the southern slip road would impact on the northern end of a site of archaeological importance, listed in the Sites and Monuments Record as 1067.
RBBC	MO12	The Borough and County Councils will seek to improve and extend the bridleway and footpath networks either by land management or by negotiation on development proposals	0	Footpath 602, connecting the Glebe road with the service road and would be disrupted temporarily during construction but with no long term impacts.
RBBC	HO7	This policy lists those sites identified on the Proposals Map, allocated for development after 1996. This includes 'Netherne Hospital, Coulsdon (Phase I)' with an approximate net increase of 200 units.	+1	The proximity of the Netherne Hospital development site may be of significance for future trip generation affecting the Dean Lane junction with the A23.
RBBC	HO8	This policy lists sites identified on the Proposals Map for possible long-term housing development. This includes 'Netherne Hospital, Coulsdon (Phase II)'	+1	As above.

HIGHWAYS AGENCY

TOLLGATE HOUSE

ENVIRONMENT & LANDSCAPE
Environmental Statement

A23/M23 HOOLEY JUNCTION – ENVIRONMENTAL STATEMENT VOL. 2 02/98



Legend:

- Sites of ancient monuments
- Sites & monuments record information
- Wholly unsuitable for further archaeological work
- Extent of survey undertaken
- C — Area reference

Rev	Date	Drawn	Description	Chk'd	App'd
P1	Feb 98	TJG	Tender issue	DJS	

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HIGHWAYS AGENCY

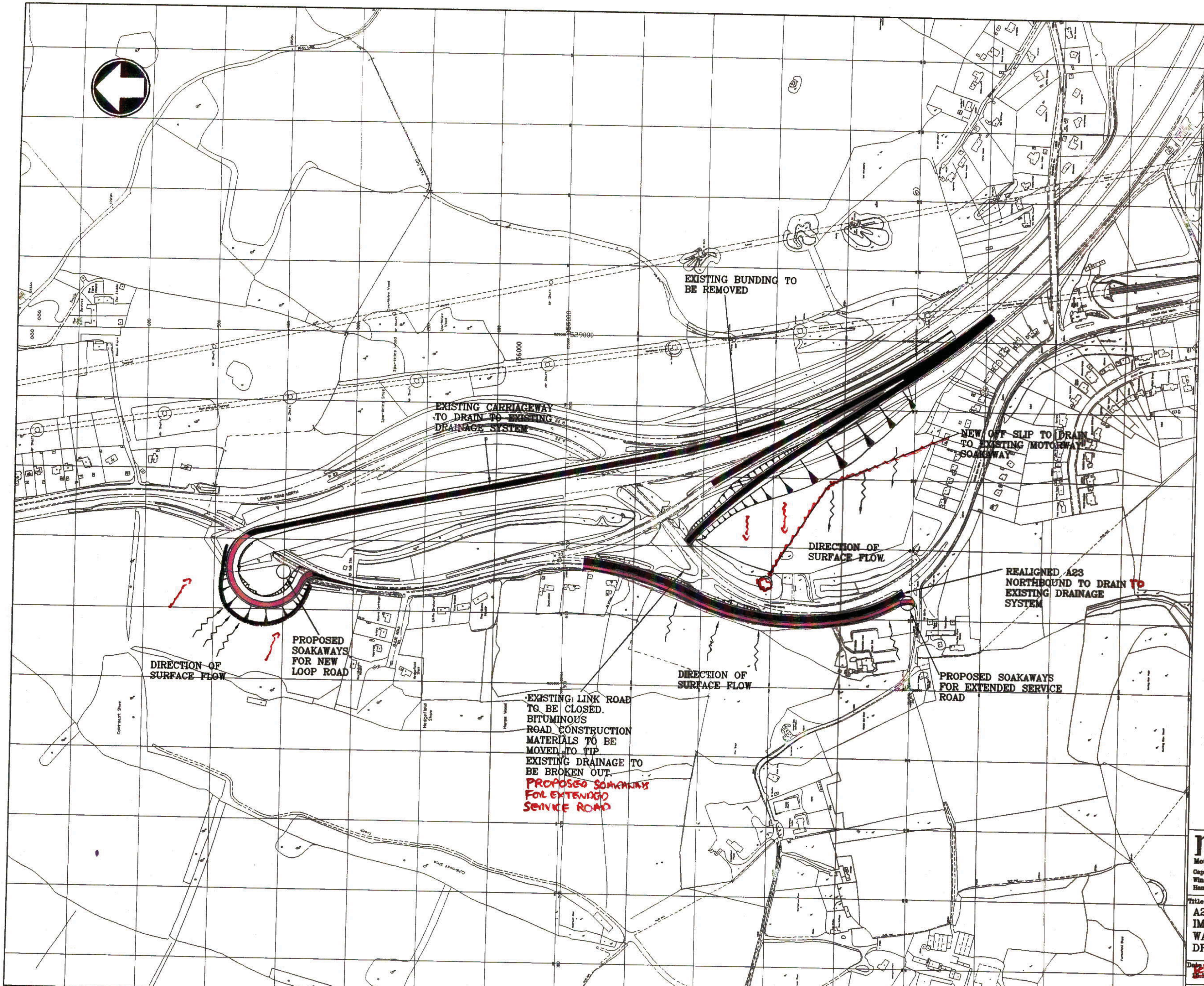
An Executive Agency of THE DEPARTMENT OF TRANSPORT

Title

A23/M23 HOOLEY JUNCTION IMPROVEMENT

Archaeology–Phase Two Survey

Designed		J.Fisher	Eng. Chk.		N/A
Drawn		T.Goodman	Coordination		N/A
Dwg. Chk.		J.Fisher	Approved		
Scale: Not to Scale		Project: 44231RL.01			Status: TEN
		CAD file: F:\swr\projects\44231rl.01\acad\fm-dwg\archaeol			
Drawing no. Figure 1.1					Rev P1



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Title
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WATER QUALITY AND DRAINAGE – PROPOSED

Date	Drawn	Checked	Approved	Scale
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Drawing No. Figure 4.2 | Rev. P2