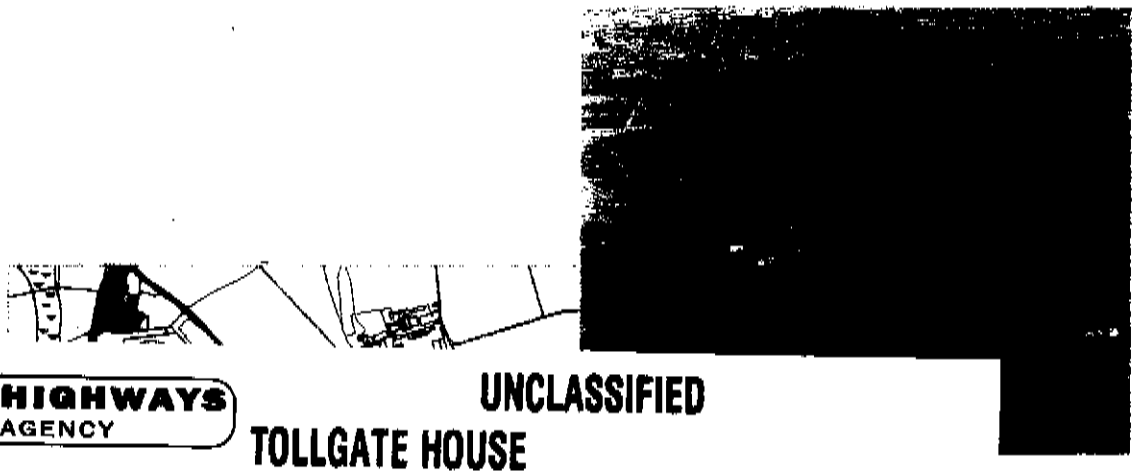
HIGHWAYS AGENCY

M4 Motorway: Proposed Bridge and Diversion for the Maidenhead Windsor and Eton Flood Alleviation Scheme



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ENVIRONMENT & LANDSCAPE
Environmental Statement

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M4 MAIDENHEAD AND WINDOSR AND ETON FLOOD ALLEVIATION SCHEME ENVIRONMENTAL STATEMENT 05/96

M4 MOTORWAY: PROPOSED BRIDGE AND DIVERSION FOR THE MAIDENHEAD, WINDSOR AND ETON FLOOD ALLEVIATION SCHEME

ENVIRONMENTAL STATEMENT

MAY 1996

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Motorway Operations Division
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Photographs

1. Panoramic view looking eastbound from the Marsh Lane overbridge across the diversion site and construction access

2. Panoramic view from the diversion site looking across the fallow agricultural land towards the woodland backdrop of western Slough to the north

3. View southwards towards the existing M4 across the site from the broken hawthorn hedgerow

4. View from the Glebe Close footpath looking towards the existing M4 embankment

5. View from Court Lane looking towards the proposed flood relief channel

6. View northwards towards the M4 from the public footpath located opposite properties at Dorney Reach on Marsh Lane

7. View from the public bridleway located to the west of Court Lane looking northwards towards Dorney Reach and the M4

NON TECHNICAL SUMMARY

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1.0 INTRODUCTION

1.1 Introduction to the Scheme

1.1.1 A new flood relief channel is to be constructed by the Environment Agency (formerly the National Rivers Authority) to the east of the River Thames as part of their Maidenhead, Windsor and Eton Flood Alleviation Scheme (MWEFAS). The route of the channel would pass under the existing M4 motorway to the east of Marsh Lane. A temporary diversion of the motorway at this point would be required to allow the construction of a bridge to carry the M4 over the new flood channel (*Figure 1.1*).

1.1.2 Construction of the motorway diversion would allow 3 lanes of traffic to flow in both directions while the bridge is being constructed. The diversion would be in operation for about a year, after which it would be removed and the site restored.

1.1.3 The term 'study area' used in the text of this report generally describes an area extending 500m either side of the proposed motorway diversion. This area was adopted during the data gathering and consultation exercise. However, the study area used for the assessment of specific environmental effects is determined by the assessment methodology for each subject assessed.

1.1.4 Draft Orders are being published under the Highways Act 1980 which, if confirmed, would permit the motorway to be diverted and for the temporary diversion to be stopped up when appropriate. A Traffic Regulation Order would also be made, to allow the enforcement of a mandatory 50mph speed limit while the works are in progress.

1.2 Purpose and Requirements of the Environmental Statement

1.2.1 Environmental Assessment (EA) is a procedure for taking account of environmental factors in the design of a scheme. The EA process involves collection and appraisal of information in order to identify environmental effects and suitable mitigation measures. The Environmental Statement is a report on the Environmental Assessment.

1.2.2 This Environmental Statement (ES) for the proposed bridge and temporary motorway diversion is issued in accordance with EC Directive 85/337, as applied by Section 105A of the Highways Act 1980.

1.2.3 This Environmental Statement has been prepared in accordance with the Stage 3 requirements of Volume 11 of the Design Manual for Roads and Bridges (DMRB)[1], incorporating Amendment No.1, dated August 1994. Volume 11 of the DMRB provides guidance on the environmental assessment of motorway and trunk road schemes. The main aims of the environmental assessment process as defined in the DMRB are as follows:

- to ensure full consideration by the Highways Agency Operating Department of the likely environmental effects of possible schemes so that decisions can be made with a knowledge of their environmental consequences, including the decision whether or not to proceed with the further development of a scheme and, if it were to go ahead, to aid the identification of ways in which the environmental effects could be minimised through route selection and other measures.

- to ensure consideration of the likely environmental effects of route options in a way which enables the importance of predicted effects and scope for mitigating these to be properly evaluated.

- to allow the public and statutory environmental bodies to comment on proposals taking account of their environmental implications.

1.3 Scope of the Environmental Assessment

1.3.1 A scoping exercise has been undertaken prior to the production of this Environmental Statement taking into account the nature of the engineering proposals and existing knowledge of the environment. A Scoping Report was prepared prior to carrying out the assessment which identified existing data already held, further survey work required and the issues to be considered in the assessment.

1.3.2 The scoping exercise identified that environmental information from two schemes in the study area of the temporary motorway diversion was available. These were the Maidenhead, Windsor and Eton Flood Alleviation Scheme (MWEFAS), described in detail in the following Chapter, and the M4 Improvements M25 (4b) to Junction 8(9) Scheme, (4b - 8(9)) which considers options for motorway widening. Data available from both of these schemes has been used in this assessment.

1.3.3 Due to the location and size of the scheme, the direct environmental effects, in addition to those which would occur as a result of the MWEFAS scheme, are limited. The potential effects considered include those on air quality, cultural heritage, construction disturbance, ecology and nature conservation, landscape effects, land use, traffic noise and vibration, pedestrians, cyclists, equestrians and the community, vehicle travellers, water quality and drainage, geology and soils and policies and plans.

1.4 Consultations

1.4.1 As part of the environmental assessment process statutory and non-statutory organisations were consulted. Summaries of comments received from consultees are given in Appendix 1.1.

1.4.2 A review of existing data identified the need to contact the following organisations to obtain the most recent data for the site:

- Former National Rivers Authority
- Buckinghamshire County Council
- South Bucks District Council
- English Nature
- Ministry of Agriculture, Fisheries and Food (MAFF)
- Buckinghamshire, Berkshire and Oxfordshire Naturalist Trust
- Buckinghamshire Badger Group
- Hawk and Owl Trust
- Otters and Rivers Project

1.4.3 The Scoping Report was sent to the following statutory bodies for comment on the studies and the methodology proposed to carry out the environmental assessment.

- Former National Rivers Authority
- Buckinghamshire County Council
- South Bucks District Council
- English Nature

1.5 Environmental Impacts Tables

1.5.1 An Environmental Impacts Table is contained in Appendix 1.2. This is a tabular presentation of data summarising the main effects of the scheme.

1.6 Structure of the Environmental Statement

1.6.1 This Environmental Statement is a summary of the findings of the Environmental Assessment. It contains information on all relevant issues. The effects during construction, the operational phase and during and after the restoration of the motorway diversion have been assessed. As no significant effects have been identified, a separate Volume containing detailed assessments is not required.

1.6.2 This report is structured as follows:

Chapter 1.0	Introduction - sets out the scope and purpose of the report.
Chapter 2.0	Background to the Maidenhead, Windsor and Eton Flood Alleviation Scheme - describes the diversion in the context of the flood alleviation scheme proposals for the area.
Chapter 3.0	Alternative Options - describes the options considered and reasons for selection of the proposed scheme.

Chapters 5.0 - 16.0	Describe the existing environment, environmental effects during construction, operation and restoration and mitigation measures for specific subjects.
Chapter 17.0	Summary of Environmental Effects - describes the positive and negative effects which would remain after mitigation.
Appendices	The appendices contain supporting information including a summary of consultation responses (Appendix 1.1) and Environmental Impacts Tables (Appendix 1.2).
Non-Technical Summary	A brochure summarising the principal sections of Volume 1 of the ES in non-technical language. It is bound into the main volume, but is also available as a free-standing document.
Confidential Species Report	A separate confidential report which assesses the effects of the scheme on statutorily protected species.

1.7 Comments

1.7.1 Comments on the Environmental Statement can be made to the Highways Agency and would be taken into consideration before a decision is made on the final form that the proposal should take. Comments should be sent to the Director of Highways at the address shown below by the date indicated in the public notices:

Highways Agency
Motorway Operations Division
Broadway
Broad Street
Birmingham
B15 1BL

1.7.2 Copies of the Environmental Statement may be inspected and Non-Technical Summaries are available free of charge during normal office hours at:

Highways Agency
Motorway Operations Division
Broadway
Broad Street
Birmingham
B15 1BL

Highways Agency
Room 12/09
St Christopher House
Southwark Street
London
SE1 0TE

Environment Agency
Thamesgate House
High Street
Maidenhead
SL6 1PT

Buckinghamshire County Council
County Hall
Aylesbury
Buckinghamshire
HP20 1UY

South Bucks District Council
Council Offices
Windsor Road
Slough
SL1 2HN

1.7.3 Copies of the Environmental Statement may be purchased from the Highways Agency at the Birmingham address above.

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2.0 BACKGROUND TO THE MAIDENHEAD, WINDSOR AND ETON FLOOD ALLEVIATION SCHEME

2.1 The Need for the Maidenhead, Windsor and Eton Flood Alleviation Scheme

2.1.1 The areas surrounding Maidenhead, Windsor and Eton are susceptible to flooding. In 1947 a severe flood affected hundreds of properties in this area. Flooding has occurred on many occasions before and since; more recently a flood in February 1990 caused flood damage to businesses, services, transport networks and approximately 500 properties.

2.1.2 Major flooding would undoubtedly continue to occur unless alleviation works are implemented. It has been estimated that a flood of equivalent magnitude to the 1947 event would affect at least 4,800 residential properties, 700 non-residential properties and a population of 12,500.

2.2 Background to the Flood Alleviation Scheme

2.2.1 In 1983, Thames Water (formerly the National Rivers Authority (NRA) Thames Region and now the Environment Agency) appointed consulting engineers to investigate the problems of flooding in this area and to formulate options for flood relief. Environmental consultants were subsequently appointed in 1985 to examine the alternative options for the flood alleviation scheme, to assess the environmental effects and identify mitigation measures and potential enhancements in connection with the flood alleviation works. A wide range of alternative methods of alleviating flooding were evaluated, taking into account both engineering and environmental factors.

2.2.2 The assessment of the environmental effects of the proposed Maidenhead, Windsor and Eton Flood Alleviation Scheme (MWEFAS) was based on comprehensive field work, research of records and existing information, and a comprehensive consultation process with local authorities, statutory bodies and local interest groups.

2.2.3 An Environmental Statement for MWEFAS was produced in January 1991 which comprised a number of Volumes. Supporting documents also accompanied the planning application [2]. A public inquiry was held in September 1992, for which various public inquiry documents were prepared [3]. Planning permission for the scheme was granted in March 1995. All statutory processes for MWEFAS are now complete.

2.2.4 The objective of the flood alleviation scheme is to reduce the frequency at which flooding occurs in this area of the Thames Valley.

2.3 Description of the Flood Alleviation Scheme

2.3.1 The proposed flood alleviation works combine various methods of increasing river capacity, the most significant being a new 11.5 kilometre flood relief channel to the

east of the River Thames. This will be designed to carry a large proportion of the flood flow (more than 200 cubic metres per second).

2.3.2 The new channel will leave the Thames upstream of Boulters Lock, run to the north of Dorney and Eton Wick close to the M4, pass around the north and east sides of Eton College playing fields and rejoin the Thames downstream of Black Potts railway bridge.

2.3.3 The channel will look like a natural river and will be fed at its upstream end by a small flow from the Thames. The channel will be opened for flood control purposes when the River Thames reaches a flow of 200 cumecs, and is thus likely to be operated at least once every year.

2.3.4 Throughout its length the channel has been positioned where possible to avoid sensitive areas. The flood relief scheme will incorporate environmental enhancements including the provision of a variety of habitats for wildlife and recreational facilities for the public.

2.4 The Requirement for the M4 Underbridge and Temporary Motorway Diversion

2.4.1 The route of the flood relief channel crosses the M4 to the east of Marsh Lane overbridge. At this location the M4 motorway would be carried across the flood relief channel on a new underbridge. A temporary diversion for a short length of the M4 would be necessary to allow the construction of the new underbridge while maintaining M4 traffic capacity.

2.4.2 Excavation of the channel under the bridge may only commence after the bridge construction has been completed and traffic has been returned to the permanent line of the motorway. This would open up the haul route for moving material excavated from the flood relief channel north of the M4 motorway to the processing plant near Junction 6, south of Chalvey.

3.0 ALTERNATIVE OPTIONS

3.1 Background

3.1.1 The route of the flood relief channel was decided following full evaluation of alternative options, extensive consultation and environmental assessment. Planning permission for the proposed route of the channel was given in March 1995. Therefore the location of the new M4 underbridge is fixed by the route of the flood alleviation channel.

3.1.2 Options for the temporary diversion of the M4 were to the north or to the south of the motorway between Marsh Lane and the Roundmoor Ditch. Both would involve similar areas of land take.

3.2 Scheme Selection

3.2.1 In September 1992 the Department of Transport published draft orders for a scheme to the south of the existing M4. A number of environmental effects would result from the diversion of the motorway to the south including:

- A slightly greater potential effect to a statutorily protected species which is fully protected under the 1981 Wildlife and Countryside Act in comparison with a scheme to the north;
- Loss of vegetation associated with the Cress Brook and the coniferous tree screen along the south of the existing motorway, which would open up views towards the diversion from a greater number of properties in comparison with the scheme to the north;
- Intrusion into an Area of Attractive Landscape, as identified in the Buckinghamshire Structure Plan and the South Bucks District Plan, which is considered as of countywide value;
- Temporary loss of land under agricultural production; and
- Crossing a site of archaeological interest.

3.2.2 In comparison, environmental effects which would result from the diversion of the motorway to the north would include:

- Loss of vegetation along the existing motorway embankment, resulting in a moderate visual impact to properties north of the diversion. The effect would be mitigated by an environmental barrier in the short term, and new planting;
- Loss of vegetation alongside the existing motorway which supports a species protected from sale by statute. This would be mitigated by habitat retention and new planting; and

- Crossing a site of archaeological interest.

3.2.3 The September 1992 proposals for a diversion to the south of the existing M4 are now withdrawn in favour of a diversion to the north as the overall environmental effect would be less.

4.0 DESCRIPTION OF PROPOSED SCHEME

4.1 Details of Proposed Temporary Motorway Diversion and Bridge

4.1.1 Travelling eastwards the diversion would leave the line of the M4 motorway immediately east of Marsh Lane overbridge. It would pass to the north of the site of the proposed flood relief channel bridge before rejoining the motorway at Roundmoor Culvert as shown on *Figure 4.1*. It would be carried on an embankment of similar height to the existing one, typically 2 metres above existing ground levels.

4.1.2 As there is lighting on the existing motorway, it would be necessary to provide lighting of a similar intensity on the diversion.

4.1.3 After construction of the new bridge traffic would be diverted back onto the existing M4 over the new bridge and the temporary diversion would be removed.

4.2 Construction Details

4.2.1 It would take approximately three months from the start of the works to establish the temporary motorway diversion. Following the transfer of the motorway traffic onto the diversion, it would take approximately six months to complete bridge construction. At this stage the diversion would be removed and restoration of the land away from the flood relief channel would be undertaken.

4.2.2 Site compound areas would be located to the north of the motorway for works associated with the diversion and to the south for bridge works in the manner indicated in the planning application for MWEFAS.

4.2.3 As described in the planning application for MWEFAS, the Environment Agency would make fill material available for construction of the embankment from the line of the flood relief channel to the north . Any topsoil and overburden above the gravel from the borrow pit could be stockpiled in a mound of 2 metres maximum height within the MWEFAS land along the boundary north of the properties in Glebe Close (See *Figure 4.1*.)

4.2.4 Pavement materials for the diversion would be imported via the local road network and Marsh Lane from the north and along the access track along the line of the channel as shown in *Figure 4.1*. This track would need to be constructed for this purpose.

4.2.5 Access to the bridge construction site would be gained along an access constructed from Marsh Lane via a temporary crossing over Cress Brook south of the motorway as shown on *Figure 4.1*. Construction vehicles would be prohibited from using Marsh Lane to the south of this access as detailed in the planning application for MWEFAS.

4.3 Decommissioning and Restoration

4.3.1 Following completion of the bridge construction, decommissioning of the temporary diversion would take place. Reinstatement of the motorway carriageway and central reserve features would involve traffic management measures similar to those for the initial works in these areas.

4.3.2 With the traffic transferred back to the motorway the paving materials of the temporary diversion would be broken out and removed. Embankment fill material would be removed to the line of the flood relief channel where it would be stockpiled for later removal concurrent with the excavation of the channel.

4.3.3 Topsoil would be replaced over the area formerly occupied by the diversion embankment with the exception of the part to be occupied by the flood relief channel.

4.3.4 Vegetation lost to the diversion would be replanted using native species found locally.

5.0 AIR QUALITY

The scheme would be unlikely to have a significant effect on air quality due to the limited nature of the works and proximity to the existing M4 motorway. The main effects would be generation of dust during construction and decommissioning. This would be mitigated by careful site management practices. During operation there would be small increases in emissions of some pollutants but these would remain within air quality standard limit levels. There would be small decreases in emissions of other pollutants including NO_2, current levels of which are close to the air quality standard limit level in certain locations. There would be no long term effects. The effect of the scheme on air quality is therefore considered minor.

5.1 Assessment Method

5.1.1 The objective of the air quality assessment was to predict potential air quality effects arising from the proposed scheme by desk study. The assessment relates current knowledge on vehicle emissions (Appendix 5.1) to the sensitive locations that may be affected in the study area.

5.1.2 The methodology adopted for the assessment (Appendix 5.1) was based on the recommendations in Part 1 of Section 3 of Volume 11 of the DMRB[1] and involved:

- Calculation of existing emissions to give an indication of current air quality.
- Calculation of air quality for the design year, based on observed traffic flow for the existing situation (the design year is taken to be the year of operation of the diversion). Due to the temporary nature of the diversion and the short timescale of construction, 1994 observed peak hour traffic flows have been used in calculations for the existing situation and with the diversion in place.
- Comparison of calculation results to give a preliminary assessment of effects on air quality at sensitive receptors and to identify the significance of any change compared to EC standards.

5.1.3 The DMRB uses the UK Air Quality Standard for nitrogen dioxide which provides a limit value for the 98th percentile of a one hour annual mean concentration of 105 parts per billion (ppb) which should not be exceeded. The DMRB adopts the United States Ambient Air Quality Standard for carbon monoxide which is an annual maximum 8 hour average concentration not exceeding 9 parts per million (ppm). The DMRB also uses an adopted air quality standard for benzene of a 1 year mean not exceeding 5ppb and for particulate matter (PM) of the 95th percentile of daily mean not exceeding $300\mu gm^{-3}$.

5.1.4 Effects on air quality can be categorised as follows:

- None: no effect on air quality
- Minor: pollutant concentrations below air quality standard limit levels but increased from existing in the design year
- Major: pollutant concentrations predicted to be approaching quality standard limit levels in the design year
- Severe: pollutant concentrations predicted to be in excess of air quality standard limit levels in the design year

5.2 Existing Conditions

5.2.1 The DMRB states that buildings or areas in which people spend a nominal 8-hour day, within 200m of the centreline of the scheme should be identified. Three residential properties at Glebe Close lie within 100m, as shown on *Figure 5.1*. No. 3 Glebe Close has been chosen to represent the properties in the immediate area, as it is the closest to the proposed temporary motorway diversion. For the purpose of air quality assessment the distance to the property is measured from the centre line of the highway. Conditions at Nos. 1 and 2 Glebe Close have been assumed to be very similar to those at No. 3. Properties on Old Marsh Lane have also been assessed because traffic speeds may be affected by the diversion which may affect air quality, even though traffic volumes and distances will remain the same. Elm House, the closest sensitive receptor to the existing carriageway has been chosen to represent this area.

5.2.2 The existing M4 is the only source of the pollutant indicators used in this assessment. Background levels of pollutants should otherwise be relatively low, compared to other areas close by, as there are no major industrial sources or dense urban areas that could contribute pollutants in the immediate area.

5.2.3 The summary of the calculation results of local air quality for the existing conditions are shown in Table 5.1.

Table 5.1 Summary of Calculation Results for Existing Conditions

Receptor	Two way peak hour traffic (veh/hr)	Speed (km/hr)	Source to Receptor Distance (m)	Pollutant Concentration			
				CO (ppm) max 8hr ave	Benz. (ppm) 1 year av.	NO_2 (ppb) 98% 1hr. av	PM (μgm^{-3}) 95% 1 day av
Elm House	11636	88.5	20	7.76	4.19	*	112.09
3 Glebe Close	11636	88.5	75	2.55	0.98	61.32	30.25
Air Quality Standard Limit Level				9	5	105	300

Note 1: Speed is the average for both carriageways during the peak hour.

Note 2: * The NO_2 level at Elm House may not be calculated precisely, using the method described in the DMRB, but it would be close to the standard limit level.

5.2.4 The results show that the existing air pollution at the receptors used is within the air quality standard limit levels used in this report, apart from the NO_2 concentrations predicted for Elm House where levels are close to the air quality standard limit level.

5.3 Construction Effects and Mitigation

Construction

5.3.1 During construction of the temporary motorway diversion the flow of traffic may be congested and the speed slow. The main effect of reduction in traffic speed would be to increase certain pollutant emission and to decrease others. In addition pollutants would be emitted from construction methods and vehicles. The main pollutants caused by construction traffic and operations would be particulates (dust). Due to the predicted concentrations of pollutants it is considered that a minor increase over a short timescale would not be significant.

Mitigation

5.3.2 Measures to minimise dust from construction activities, practices such as wheel washing and damping down in dry conditions, would be used when required to mitigate air quality effects.

5.4 Operational Effects and Mitigation

Operation

The Scheme Air Quality

5.4.1 Predicted traffic figures for the temporary motorway diversion are the same as those observed for the existing situation. The receptor at Elm House would not be any closer to the temporary carriageway compared to the existing situation, but the mandatory speed limit for the diversion would be 50mph (80.5kph). This value has

been used for assessment of air quality. The diversion would bring traffic slightly closer to the receptor at Glebe Close.

5.4.2 The summary of the calculation results of local air quality for the scheme are shown in Table 5.2.

Table 5.2 Summary of Calculation Results for the Diversion

Receptor	Two way peak hour traffic (veh/hr)	Speed (km/hr)	Source to Receptor Distance (m)	Pollutant Concentration			
				CO (ppm) max 8hr ann	Benz. (ppm) 1 year av.	NO_2 (ppb) 98% 1hr. av	PM (μgm^{-3}) 95% 1 day av
Elm House	11636	80.5	20	7.43	4.21	*	103.28
3 Glebe Close	11636	80.5	70	2.74	1.11	60.41	30.07
Air Quality Standard Limit Level				9	5	105	300

Note 1: Speed is the average for both carriageways during the peak hour.

Note 2: * The NO_2 level at Elm House may not be calculated precisely, using the method described in the DMRB, it would be close to the standard limit level but would be less than existing due to the reduced traffic speeds on the diversion.

5.4.3 The results show all pollutants would be within air quality standard limit levels during operation of the diversion, apart from NO_2 at Elm House where levels are close to the air quality standard limit level.

Assessment of the Effects of the Scheme on Local Air Quality

5.4.4 Air pollution is currently within air quality standard limit levels for sensitive areas apart from NO_2 levels at Elm House and immediately adjoining areas where levels are close to the air quality standard limit level. The only differences between the diversion and the existing conditions would be decreased vehicle speed and a slight decrease in distance to the receptor at Glebe Close.

5.4.5 The receptor at Glebe Close shows marginal increases in CO and benzene concentrations and marginal decreases in NO_2 and PM concentrations due to the diversion but pollutant levels remain within air quality standard limit levels.

5.4.6 The Elm House receptor shows a marginal increase in benzene, a marginal decrease in CO, PM and NO_2. The NO_2 level still remains close to the air quality standard limit level.

Assessment of the Effects of the Scheme on Regional Air Quality

5.4.7 The size of the scheme indicates that the pollutant contribution to the regional air quality would be low compared to contributions from other sources. The total annual pollutant contribution would be very low compared to UK totals shown in The National Atmospheric Inventory, published annually in the Digest of Environmental Protection and Water Statistics[4] (see Appendix 5.1). The situation

would be very similar to the existing motorway and therefore the effect on regional air quality would not be significant.

Mitigation

5.4.8 No mitigation measures are considered necessary during operation of the temporary motorway diversion since predicted pollution concentrations do not indicate an impact to air quality from the diversion.

5.5 Decommissioning and Restoration

5.5.1 During decommissioning and restoration traffic would be returned to the existing carriageway and therefore pollutant concentrations would return to those predicted for the existing situation. The work involved with decommissioning may generate dust (PM) but with measures to control dust, effects would be mitigated.

5.6 Summary of Effects

5.6.1 The temporary motorway diversion would result in very minor changes to air quality. Calculations for the existing situation and the diversion show a slight benefit to local air quality, even though levels of NO_2 would remain close to air quality standard limit levels at Elm House. The effect on regional air quality would not be significant.

5.6.2 During construction, decommissioning and restoration the potential would exist for dust (PM) generation, but with measures to control dust, effects on air quality would be mitigated.

5.6.3 The overall effect on air quality is considered to be of minor significance.

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6.0 CULTURAL HERITAGE

The scheme would be unlikely to have a significant effect on cultural heritage due to the limited nature of the works. The main effects would be disturbance of part of Lots Hole archaeological site. This would be mitigated by a project archaeologist observing top soil stripping and excavations. The effect on cultural heritage is therefore slight.

6.1 Assessment Method

6.1.1 The objective of the assessment of cultural heritage was to determine the significance of the effects arising from the proposed diversion on relevant features within the study area.

6.1.2 The basic methodology adopted for the assessment was based on the recommendations in Section 2, Part 3 of Volume 11 of the DMRB[1] and involved:

- A desk study to check and update existing data from the M4 (4b-8(9)) and MWEFAS Schemes.
- Assessment of the effects and determination of the significance of the proposed scheme on the features identified.
- Identification of appropriate mitigation measures.

6.1.3 The significance of the likely effects of the scheme on cultural heritage was determined using the following criteria:

- None: no loss or damage
- Slight: small loss due to damage, almost unidentifiable.
- Moderate: loss due to damage that would be noticeable, feature/context not destroyed.
- Severe: features completely destroyed, damaged to the extent of devaluing importance of the site.

6.2 Existing Conditions

6.2.1 There are no Scheduled Ancient Monuments or Listed Buildings in the study area. Huntercombe Conservation Area (*Figure 6.1*) lies just in the east of the study area.

6.2.2 A site of cultural heritage interest, known as Lots Hole, lies in the line of the temporary motorway diversion and extends both north and south of the existing M4 motorway, as shown on *Figure 6.1*. Previous studies[5,6] carried out for the MWEFAS scheme and as part of the M4 (4b-8(9)) scheme (Appendix 6.1) involved a desk top study, fieldwalking, geophysical survey and earthwork survey of the site. Evaluation trenching, carried out in 1991, identified the cropmark complex,

enclosure and ring ditch as dating from Early to Mid Bronze Age. It is thought the site may also contain preserved organic artefacts. The site was partially damaged during the construction of the Slough Bypass, and is recorded and identified on the Buckinghamshire County Sites and Monuments Record (SMR) as site PRN 2114.

6.3 Scheme Effects and Mitigation

Construction

6.3.1 The route of the flood channel would pass through the Lot's Hole site. A full excavation of the layers overlying gravels in the area affected by the channel, including palaeoenvironmental sampling, would be carried out as part of the MWEFAS scheme in advance of the underbridge and temporary motorway diversion contract being let. Archaeological excavation of this area of Lot's Hole would therefore be carried out and any finds would be fully documented and recorded, prior to the construction of the underbridge and temporary motorway diversion.

6.3.2 The temporary motorway diversion would affect part of the Lot's Hole site which lies outside the area planned for excavation as part of the MWEFAS scheme. The archaeological site would also be affected by excavation of the undisturbed ground under the existing motorway embankments for construction of bridge foundations.

6.3.3 There would be no effect to the setting of Huntercombe Conservation Area.

Operation and Restoration

6.3.4 There would be no effects upon archaeological features during operation of the diversion or restoration of the site. Topsoil would be replaced on the area of Lot's Hole archaeological site outside that required for the MWEFAS channel.

Mitigation

6.3.5 The archaeologist for MWEFAS would also act as project archaeologist for the bridge and temporary motorway diversion scheme. The project archaeologist would observe top soil stripping during the construction of the temporary diversion for the area which falls outside that subject to the programmed archaeological excavation for the MWEFAS scheme. The archaeologist would also observe excavation works for the bridge foundations. Any finds could therefore be documented and recorded.

6.4 Summary of Effects

6.4.1 The temporary motorway diversion would not affect any Listed Buildings, Conservation Areas or designated sites.

6.4.2 As part of the MWEFAS scheme, part of Lot's Hole archaeological site would be subject to archaeological investigation prior to the construction of the temporary motorway diversion and the scheme would therefore have no effect on this part of

the site. The area affected by the temporary motorway diversion outside that required for the MWEFAS scheme and the excavation of the bridge foundations would be subject to an archaeological watching brief during construction. Top soil would be replaced following decommissioning.

6.4.3 The effect of this scheme on cultural heritage is considered to be slight.

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7.0 DISRUPTION DUE TO CONSTRUCTION

The scheme would be unlikely to have a significant effect as a result of disruption due to construction due to the limited nature of the works. The main effects would be construction noise. Measures will be incorporated into the scheme which would mitigate this effect. The effects would be short term and temporary in nature.

7.1 Assessment Method

7.1.1 The objective of the assessment of disruption due to construction was to determine the relevant effects arising during the construction period within the study area.

7.1.2 The basic methodology adopted for the assessment was based on the recommendations in Part 3 of Section 3 of Volume 11 of the DMRB[1] and involved:

- Verification of number of properties within 100m of the temporary motorway diversion.
- Checking for the presence of areas or features of archaeological or ecological value within 100m of the scheme which have been reported in Chapters 6 and 8 respectively.
- The identification of construction activities which could have particularly significant effects, other than those assessed for the specific topics described in Chapters 5, 6 and 8 to 16.
- Calculating and assessing construction noise and vibration.

7.2 Existing Conditions

7.2.1 There are three residential properties within 100 metres of the temporary motorway diversion at Glebe Close: The Badgers, Ty Glas and September House.

7.2.2 Only one site of archaeological interest has been identified within 100 metres of the scheme. Known as Marsh Lane East (Lots Hole) it extends both north and south of the motorway as shown on *Figure 6.1*.

7.2.3 There are no National Nature Reserves or Sites of Special Scientific Interest (SSSI) in the study area. However, there are two habitats of major local nature conservation value; the M4 Elm Copse and 'semi-natural woodland and hedgerow' shown respectively as G and H on *Figure 8.1*.

7.2.4 There are two watercourses, Roundmoor Ditch and Cress Brook, which may be affected by construction activities and are both classed as main rivers by the Environment Agency. They are both of poor water quality being classified as F (very poor) and E (poor) respectively.

7.2.5 Other than MWEFAS and the M4 (4b-8(9)) scheme there are no known proposals for major construction works in the immediate vicinity of the temporary motorway

diversion site. The site is located in green belt land, which forms part of the Metropolitan Green Belt surrounding London, therefore precluding inappropriate development.

7.2.6 Land to be used temporarily for the motorway diversion, outside the existing highway boundary, is mostly agricultural and lying fallow this year.

7.2.7 The geology of the study area affected by the diversion comprises Reading Beds overlain by Flood Plain Gravels which in turn are overlain by Alluvium in places. The Gravels are found to a depth of up to 9.8 metres.

7.3 Scheme Effects and Mitigation

7.3.1 The effects which would arise during the construction period are generally of short term duration and localised in nature. In considering the possible methods of mitigation it is necessary to balance the severity of the effect with its duration. For example, it may be better to cause greater disruption over a short period than less disruption over an extended period. Construction operations result in effects on the various environmental aspects and these are fully described in Chapters 5, 6 and 8 to 16 of this report.

Earthworks

7.3.2 About 16,000 cubic metres of fill material would be required to construct the embankment. The material is most likely to be taken from the line of the flood relief channel by agreement between the Environment Agency and the contractor as described in the planning application for MWEFAS. This would negate the need to bring in such materials from other sources. The material would be transported along a fenced construction access corridor as shown on *Figure 4.1.* Stripped top soil would be stored in a stockpile of maximum height of 2 metres near the northern boundary of the Glebe Close properties.

Construction Noise and Vibration

7.3.3 Construction noise and vibration are potentially the most disruptive aspects of construction work. It is generally accepted that for long term construction projects noise emissions from daytime works should be controlled to below 75 dBL $_{Aeq\ (12hr)}$ at any nearby dwellings. Higher noise levels are usually permitted for short term operations such as pile driving operations, however lower noise levels may be required where works are programmed for evening and night-time periods. (Information on noise characteristics and units is given in Appendix 7.1.)

7.3.4 The Control of Pollution Act 1974[7] gives local authorities a number of powers to control construction noise, including specifying noise limits for construction sites, the type of equipment which may be used and the hours during which work can be carried out. It also requires that the 'best practicable means' are employed to minimise the effect of noise. In practice, a balance has to be attained between protecting the amenity of local residents without placing undue hindrance on, or prolonging, the construction works.

Calculation of Construction Noise

7.3.5 British Standard 5228:1984 'Noise control on construction and open sites[8] is an approved code of practice providing guidance on predicting noise levels, carrying out noise monitoring and methods of controlling noise from construction sites. It includes a basic method for estimating the likely level of noise that would result from proposed construction works in terms of L_{Aeq} over the working day. This method has been used as the basis for evaluating the likely levels of construction noise associated with the proposed temporary diversion of the M4 and construction of the new underbridge.

7.3.6 Noise levels from the construction works would vary over time according to the nature, location and duration of the particular operations that are being undertaken. In terms of potential noise effects the main construction operations are set out below:

a) Construction of Temporary Diversion:

- initial topsoil strip over area of temporary embankment and borrow pit;
- excavation of fill material from borrow pit and transportation to temporary motorway diversion site for subsequent spreading and compaction; and
- pavement laying operations involving an average of 125 lorry movements/day over 2 weeks.

b) Bridge Construction:

- excavations for foundations, supported by vibro-piled steel sheet-piling;
- reinforced concrete sub-structure; and
- cast in situ reinforced concrete deck.

c) Removal of Diversion:

- breaking out road surface, excavation of embankment and replacement of topsoil.

7.3.7 Construction noise levels have been calculated using the 'SITENOISE' computer program. This enables a three dimensional computer model of the various workings, noise sources, ground contours, residential properties and noise barriers to be developed as an aid to undertaking automated noise calculations. To improve the accuracy of the calculations, the noise barrier algorithm adopted in Calculation of Road Traffic Noise (CRTN) [9] has been used instead of the -5 or -10 dB(A) barrier correction in BS 5228. The SITENOISE program enables the contribution of noise from each item of plant, allowing for attenuation of noise over distance and noise shielding effects, to be calculated and summed to obtain the predicted noise level at each calculation point. In accordance with the BS 5228 method, a façade reflection

correction of + 3 dB(A) has been included. The sound attenuation resulting from 'soft ground' absorption has not been included.

7.3.8 Sound power level data for the likely items of construction plant have been derived from previous experience, manufacturers' data, and the noise levels listed in BS 5228.

7.3.9 Noise levels have been calculated for a sample of the nearest residential properties to the proposed works which would be expected to be exposed to the highest levels of construction noise. Since it is envisaged that the works would be carried out during daytime working hours, the noise levels have been calculated at ground floor level of the houses. For any particular construction activity (e.g. earthworks for the temporary motorway diversion) the resulting noise levels at any one point away from the works would vary as the works progress along the route. Where this occurs the noise calculations have been based on the nearest works. The calculated noise levels therefore represent the 'worst case' noise levels which would only be experienced for a limited period of time. The results of the construction noise calculations are shown in Table 7.1; the values shown relate solely to construction noise.

Table 7.1 - Calculated Construction Noise Levels in $L_{Aeq(12hr)}$

Location	Initial Soil Strip in $L_{Aeq(12hr)}$	Diversion Construction in $L_{Aeq(12hr)}$	Bridge Construction in $L_{Aeq(12hr)}$	Removal of Diversion in $L_{Aeq(12hr)}$
1 Glebe Close	60 dB(A)#	66 dB(A)	57 dB(A)	66 dB(A)
2 Glebe Close	65 dB(A)#	68 dB(A)	58 dB(A)	69 dB(A)
3 Glebe Close	70 dB(A)#	73 dB(A)	59 dB(A)	72 dB(A)
7 Old Marsh Lane	48 dB(A)	54 dB(A)	48 dB(A)	53 dB(A)
19 Marsh Lane	50 dB(A)	56 dB(A)	60 dB(A)	56 dB(A)

(# - Noise levels may be slightly higher during the forming of the soil stockpile)

Assessment of Construction Noise Effect

7.3.10 It is generally accepted that for long term construction projects noise emissions from daytime works should be controlled to below 75 $dBL_{Aeq(12hr)}$ at any nearby dwellings although higher noise levels are usually permitted for short term operations such as impact pile driving operations, demolition works, etc.

7.3.11 The results of the calculations indicate that construction noise levels would not be expected to exceed 75 $dBL_{Aeq(12hr)}$ at the nearest residential properties for any significant period of time. Noise levels may be slightly higher at some properties during the forming of the soil stockpile due to its proximity to the dwellings. In view of the relatively modest predicted levels of construction noise, the anticipated duration of the works, and the prevailing noise climate of the area, it is considered that the noise effect of the construction works would be relatively low. Nevertheless,

all reasonably practicable steps would be taken to minimise disturbance to local residents.

Construction Noise Mitigation Measures

7.3.12 In accordance with Sections 60 and 61 of the Control of Pollution Act (1974) the best practicable means should be employed to minimise the noise effect of the proposed construction operations, this includes:

- limiting the hours of working;
- selection of sound-suppressed plant;
- maintenance of plant and equipment;
- use and siting of equipment; and
- use of enclosures and barriers.

7.3.13 Many of these measures, which are discussed below, would be included as conditions in the contract document for the construction works. Wherever possible any particularly noisy operations in the vicinity of noise-sensitive development would be carried out during daytime working hours (0700-1900). Where noisy operations cannot be avoided at other times, special attention would be given to controlling noise emissions by the appropriate use of acoustic screens, enclosures, etc.

7.3.14 Certain types of new construction plant are now required to meet stringent EC limits on noise emissions. Therefore excavators, bulldozers, and compressors used on the site would comply with EC noise limits. Breaking of existing road surfaces, concrete, etc. should usually be undertaken by the use of hydraulic breakers. Where the use of pneumatic breakers, drills, etc. is unavoidable suitable exhaust mufflers and dampened tools would be fitted.

7.3.15 Plant and equipment would be regularly maintained by trained personnel, with particular attention given to the condition of noise attenuation features such as silencers and acoustically treated body panels.

7.3.16 Machines which are operated intermittently such as cranes would be shut down between work periods or throttled down to a minimum. Equipment such as generators and compressors would not be left running unnecessarily and would be positioned as far as possible from noise sensitive dwellings. Acoustic covers fitted to engines, generators and compressors would be kept closed when in use.

7.3.17 Noise emissions from any plant, such as generators and pumps, which may be required to run overnight in the immediate vicinity of residential properties would be controlled by the provision of appropriate screening or acoustic enclosures.

Assessment of Effect of Construction Vibration

7.3.18 Construction operations such as earthworks can generate groundborne vibrations. The level of groundborne vibration that would be experienced at residential properties depends on a number of factors including the distance from the works, the type of works being carried out, and the intervening ground conditions. Vibration

levels from general construction works cannot be readily predicted. In practice, vibration levels from general earthworks tend to be very low and no vibration problems are anticipated for the proposed construction works. Higher vibration levels can be generated during pile driving works. However, sheet piling is only likely to be required for a short duration for the bridge piers which are well away from residential properties.

7.3.19 The relevant British Standard for assessing the potential 'nuisance' effect of vibration on nearby residents is BS 6472 'Guide to evaluation of human exposure to vibration in buildings'[10] . The standard suggests that for residential buildings exposed to continuous vibration over a 16 hour day, acceptable magnitudes of vibration would be 0.3-0.6 mm/s peak particle velocities (PPV). It is envisaged that the proposed construction works would be carried out during a normal 12 hour working day. It is therefore considered that an appropriate maximum groundborne vibration limit for any continuous vibration from general construction works should be 0.5 mm/s PPV at residential properties. For intermittent vibration (e.g. from a passing vibratory roller) a higher limit of 1.0 mm/s would be appropriate. It is anticipated that the recommended levels would not be exceeded.

Construction Vibration Mitigation Measures

7.3.20 Mitigation measures would not be required for construction vibration as it is anticipated that the recommended levels would not be exceeded.

7.4 Summary of Effects

7.4.1 Most highway engineering projects result in some noise disturbance and the proposed temporary motorway diversion and bridge works are no different in this respect. However, the results of the calculations indicate that construction noise levels would be below 75 $dBL_{Aeq(12hr)}$ in residential areas. Measures have been incorporated into the scheme which would aid noise control as recommended in BS 5228.

7.4.2 Vibration levels due to construction are expected to be very low and appropriate control limits have been recommended.

8.0 ECOLOGY AND NATURE CONSERVATION

The scheme would be unlikely to have a significant effect on ecology and nature conservation due to the limited nature of the works. The main effects would be loss of part of a Wych Elm copse which supports a species protected from sale by statute and loss of part of a field which supports a number of invertebrate species. These effects would be mitigated by minimising habitat loss and replacement planting.

8.1 Assessment Method

8.1.1 The objective of the assessment was to determine the significance of the effects arising from the proposed scheme on ecology and nature conservation.

8.1.2 The methodology adopted for the assessment was based on the recommendations in Part 4 of Section 3 of Volume 11 of the DMRB[1] and involved:

- A desk study to check and update existing data from ecological assessment work carried out for the M4 (4b-8(9)) and MWEFAS schemes.
- A targeted consultation exercise.
- A detailed Phase 1 habitat survey of the study area.
- An assessment of species protected by statute.
- An assessment of the significance of the effects.
- Identification of appropriate mitigation measures.

8.1.3 The results of the consultation and desk studies undertaken for the M4 (4b-8(9)) and MWEFAS schemes have been reviewed and assessed (organisations that were consulted for these schemes are listed in Appendix 8.1). The consultations and data search for the M4 (4b-8(9)) scheme covered a 500 metre corridor either side of the carriageway. The MWEFAS consultations concentrated on the immediate vicinity of the flood relief channel, a section of which also coincides with the proposed temporary motorway diversion. Appendix 1.1 summarises the consultation responses undertaken as part of the diversion scheme.

8.1.4 Field survey work took into consideration previous surveying undertaken for the M4 (4b-8(9)) and MWEFAS schemes. A detailed Phase 1 Habitat Survey to assess the general ecological significance of habitats within the study area was undertaken based on a 100 metre corridor either side of the motorway. Two habitat survey visits were undertaken using standardised Phase 1 Habitat Methodology[11]. Visits were undertaken in the spring (24 April 1995) and the summer (13 July 1995). Two visits allowed a greater range of species to be identified and a more effective assessment to be made. All areas of nature conservation value were mapped at a 1:2500 scale. Detailed target notes were made to describe and assess the flora and

fauna (including invertebrates, birds and mammals). The review of data from previous species specific surveys was considered to provide a sufficient level of detail for the study area. Therefore no additional species specific surveys were undertaken.

8.1.5 The process of assessing the nature conservation value of different habitats has relied on the application of a number of key ecological criteria. As recommended in the DMRB, Ratcliffe criteria have been used as a check list of ecological features. Ratcliffe criteria are:

- Habitat fragility
- Rarity of the habitat type and or species assemblage
- Size of habitat
- Diversity of the habitat and species composition
- Potential value of the habitat
- Position within the ecological/geographical unit
- Typicalness of the habitat
- Recorded history of the site
- Naturalness of the habitat
- Intrinsic appeal of the site.

8.1.6 Ratcliffe criteria were originally devised to assess and compare the ecological significance of Sites of Special Scientific Interest (SSSI). For habitats which fall well below SSSI standard, which includes all habitats within the study area, the majority of the Ratcliffe criteria are not really applicable. The most significant criteria used in this assessment were:

- The degree of habitat naturalness - unimproved and semi-improved habitats generally support more complex and species rich assemblages, and are more vulnerable to damage than improved or artificial habitats.

- The floristic composition of the habitat - species rich sites, or habitats with species compositions characteristic of unimproved or semi-improved habitats have been assessed as being of higher conservation value than species poor habitats.

- The associated invertebrate, bird, reptile, amphibian and mammal assemblage, including rare or statutory protected species.

8.1.7 Using Ratcliffe criteria, habitats within the study area were assessed in terms of their nature conservation value.

8.1.8 The study area does not support any National Nature Reserves, or SSSI's. In addition site surveying has not identified any habitats which could be considered to be of national or regional nature conservation value. As a result, all the habitats identified have been considered to be of a lesser significance and have been assessed in terms of their local nature conservation value. Within the broad category of local

nature conservation value, habitats have been further ranked into one of four levels of habitat significance:

- Negligible nature conservation value: habitats of minimal local nature conservation importance
- Minor local nature conservation value: habitats of low local nature conservation importance
- Medium local nature conservation value: habitats of moderate local nature conservation importance
- Major local nature conservation value: habitats of high local nature conservation importance.

8.1.9 The significance of the ecological effects of the scheme have been assessed using the following principal considerations:

- The existing nature conservation value of the site.
- The degree of direct habitat loss.
- The indirect effects of construction and operation (e.g. run-off pollution of watercourses and noise and dust disturbance).
- The degree of habitat severance or fragmentation, including the effect on animal territories, habitat richness and viability.
- The potential effect on statutorily protected species.
- The degree of permanence associated with the effect. Permanent effects, such as habitat loss are generally of greater significance than temporary effects such as short term habitat disturbance from noise.

8.1.10 All effects have been assessed in their local context. None of the effects are considered to be of national or regional significance. The degree of significance of the likely effects of the scheme on individual habitats have been assessed as follows:

- None: no effect on areas of nature conservation value or species interest.
- Slight: a small and/or temporary effect, which may be effectively mitigated.
- Moderate: mitigation may partially ameliorate the effect.

- Severe: a highly significant permanent effect to the local nature conservation value. Mitigation would either be ineffective or take considerable time to become effective.

8.1.11 Although a degree of subjectivity is inevitable, the comparative ranking and rating of effects provides a sufficient level of detail for the purpose of the assessment.

8.2 Existing Conditions

8.2.1 Within the study area the two previous assessments recorded no significant areas of floristic value and no important invertebrate, bird, reptile or amphibian habitat. However, survey work for the M4 (4b-8(9)) scheme did identify a mammal species protected by statute [12]. The survey data is reviewed and assessed in the Confidential Species Report.

8.2.2 The study area lies within an arable landscape. It includes areas of woodland, scrub, semi-improved grassland, gardens and two small watercourses. The arable fields and gardens are of a negligible local nature conservation value and have not been assessed in detail. The remainder of the study area has been divided into eight separate habitats. *Figure 8.1* shows the location and extent of each habitat. The habitats have been categorised in terms of their local nature conservation value and described and assessed with extended target notes:

Negligible Local Nature Conservation Value

A. Eastern Field

A large fallow arable field characterised by a mixture of low growing invasive grasses and arable weeds interspersed by a high proportion of bare stoney ground. Typical species include Yorkshire Fog (*Holcus lanatus*), Annual Meadow Grass (*Poa annua*), Cocksfoot (*Dactylis glomerata*), Teasel (*Dipsacus fullonum*), Prickly Lettuce (*Lactuca serriola*), Willowherbs (*Epilobium species*), Sow Thistles (*Sonchus species*), Ragwort (*Senecio jacobea*) and low growing mosses. The habitat is in an early stage of succession, with a high proportion of pioneer, invasive species. As a fallow field, it is expected to return to agricultural production and the habitat structure is unlikely to significantly develop. The Eastern Field is of a very limited ecological value.

B. M4 Road Verge

The M4 Road Verge supports a species poor assemblage of tall grasses and tall herbs. Typical species include False Oat-grass (*Arrhenatherum elatius*), Cocksfoot (*Dactylis glomerata*), Twitch (*Elymus repens*), Hogweed (*Heracleum sphondylium*) and Hemlock (*Conium maculatum*). The verge has some value for invertebrates. During the site survey, Meadow Brown, Gatekeeper and Essex Skipper butterflies were recorded. However the habitat is a very typical example of a species poor motorway verge with little habitat structure and a limited ecological value.

Minor Local Nature Conservation Value

C. *Marsh Lane Embankment*

The embankments along Marsh Lane are dominated by a dense planted scrub layer. The scrub is even aged with very little habitat structure. Typical species are Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Field Maple (*Acer campestre*) and Dog Rose (*Rosa canina*). In small pockets the embankment supports areas of open, species rich grassland characterised by Yorkshire Fog (*Holcus lanatus*), Red Fescue (*Festuca rubra*), Cocksfoot (*Dactylis glomerata*), Black Knapweed (*Centaurea nigra*) and Birds-foot-trefoil (*Lotus corniculatus*).

The embankment has some value as invertebrate, small mammal and small bird habitat. However, the lack of an established habitat structure limits the range of habitats supported. Surveying undertaken for the M4 (4b-8(9)) scheme identified a species protected from sale by statute in this area (see Confidential Species Report).

D. *Roundmoor Ditch*

The Roundmoor Ditch is a poor quality watercourse (Class F) which is narrow (up to two metres in width) and shallow (between 10-20 cm in depth), with a bed composed of black, anaerobic silt. The Ditch supports no submerged or emergent vegetation, and the banks are covered in a rank vegetation of Nettle (*Urtica dioica*), Cleavers (*Galium aparine*), Hairy Willowherb (*Epilobium hirsutum*) and Hemlock (*Conium maculatum*). The most important habitat associated with the Ditch is the succession of mature pollarded and unpollarded White (*Salix alba*) and Crack Willow (*Salix fragilis*) trees. These have significant ecological value as invertebrate and bird habitat. During the spring survey Wrens were recorded holding territories along the Ditch, and a Blue Tit was seen entering a nest hole with food. During the summer visit, low numbers of two Damselfly species were recorded; Common Blue Damselfly (*Enallagma cyathigerum*) and Banded Agrion (*Calopteryx splendens*). It is considered unlikely that either species breeds in the Ditch.

E. *Cress Brook*

During the summer survey visit the Cress Brook was dry. The channel has little or no associated emergent flora and is shaded by tall Crack (*Salix fragilis*) and White Willow (*Salix alba*) trees. The banks support a dense undergrowth of Nettle (*Urtica dioica*), Cleavers, (*Galium aparine*), Hogweed (*Heracleum sphondylium*) and Comfrey (*Symphytum officinale*). This vegetation extends west into the adjacent arable field where it forms a wide band of rank grass, tall herbs and arable weeds. Characteristic species include Sterile Brome (*Bromus sterelis*), Twitch (*Elymus repens*), Hemlock (*Conium maculatum*), Welted Thistle (*Carduus acanthoides*), Ragwort (*Senecio jacobea*), Nettle (*Urtica dioica*) and Hairy Willowherb (*Epilobium hirsutum*). During the summer visit this mixture of tall, rank vegetation supported a relatively species rich invertebrate fauna. This included abundant Essex Skipper, Gatekeeper, Cardinal Beetle and bumblebees. The channel of the Cress Brook has a low nature conservation value, however the association of

mature willow trees and mixed herbaceous vegetation provides a variety of invertebrate, bird and small mammal habitat.

Medium Local Nature Conservation Value.

F. *Western Field*

This area of rank grassland has apparently developed on disturbed ground. The grassland is characterised by an abundance of False Oat-grass (*Arrhenatherum elatius*), and Cocksfoot (*Dactylis glomerata*) with a range of herbaceous species including Chickory (*Cichorium intybus*), Hogweed (*Heracleum sphondylium*), Teasel (*Dipsacus fullonum*), Black Horehound (*Ballota nigra*), Toadflax (*Linaria vulgaris*), Ribwort Plantain (*Plantago lanceolata*), and Creeping Thistle (*Cirsium arvense*). At the eastern end of the field there are small isolated patches of Common Reed (*Phragmites communis*) and throughout there are scattered small Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymous europaeus*) bushes. Bramble thickets grow along the western and northern edges of the site. Along the boundary of the M4 there is an area of vegetated building rubble.

The grassland is a species rich invertebrate habitat, supporting an assemblage characteristic of tall grassland. During the two survey visits, 18 species of butterfly were recorded in the field. These included an abundance of Essex Skipper, Meadow Brown and Gatekeeper with smaller numbers of Small Skipper, Large Skipper, Common Blue, Small Copper, Orange Tip and Brimstone. A solitary female Marbled White was recorded. The study area is close to the eastern limit of the Marbled White's range in central, southern England[13]. The Bramble around the periphery of the field is important for Small Tortoiseshell, Peacock, Red Admiral and Comma, and also supported an abundance of bumblebee species including *Bombus lucorum, Bombus terrestris, Bombus lapidarius* and *Bombus pascuorum*.

During the July site visit, grasshoppers and bush crickets were recorded in abundance. These included three very common species; Meadow Grasshopper, Field Grasshopper and Roesel's Bush Cricket. The latter is of some significance. It is a species which was once associated with estuarine grassland but which has experienced a recent expansion of range. Until recently Cox Green, near Maidenhead, was recorded as the most westerly locality for this species in England[14]. Reference to recent British Wildlife magazines records that the species has recently spread further west along the Thames Valley well into Oxfordshire and Berkshire[15]. Despite this expansion of range the record from within the study area is still of local interest.

In itself the floristic and habitat structure of the Western Field is of relatively limited ecological value. However the association of grassland invertebrates, and the close proximity of other species rich habitats increases the local significance of the habitat.

Major Local Nature Conservation Value

G. *M4 Elm Copse*

This habitat primarily consists of planted Wych Elm (*Ulmus glabra*) trees along the boundary of the M4, and along part of the Marsh Lane embankment. Although the copse supports a species poor ground flora, has a poorly developed habitat structure, and is of relatively low value for breeding birds and mammals, it supports a colony of invertebrate species which is protected from sale by statute. The species is dependent on Elm. The Confidential Species Report describes and assesses the species and habitat.

H. *Semi-Natural Woodland and Hedgerow*

A small copse and associated hedgerow lies north of the temporary motorway diversion. At its northern end, the woodland supports a large stand of tall Elm trees (*Ulmus species*), further south the woodland is dominated by dense Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) bushes with occasional Ash trees. The eastern boundary of the wood is formed by a species rich hedgerow with tall Elm trees, Spindle (*Euonymous europaeus*), Buckthorn (*Rhamnus catharticus*), Crab Apple (*Malus domestica agg.*) and Hawthorn (*Crataegus monogyna*). The ground flora is principally composed of Nettle (*Urtica dioica*), Ivy (*Hedera helix*), Bramble (*Rubus fruticosa*) and Wood False-Brome (*Brachypodium sylvaticum*). The habitat is important invertebrate habitat including the foodplant for the Brimstone butterfly (Buckthorn). Ringlet, Large Skipper and Speckled Wood butterflies were all recorded during the site visits. The site also has the potential to support the same species protected from sale by statute identified in the M4 Elm copse (Habitat G). In addition the woodland supports breeding bird habitat; Blackcap, Blackbird, Wren and Chaffinch were all recorded singing in the woodland. The woodland is semi-natural and relatively species rich. Within the study area it is the most significant of all the habitats recorded.

8.3 Construction Effects and Mitigation

Construction

8.3.1 Construction of the temporary motorway diversion would result in the loss of part of the M4 Elm Copse. This would have a moderate local effect on an invertebrate species protected from sale by statute by reducing the breeding area (refer to Confidential Species Report).

8.3.2 There are a number of invertebrate species associated with the Western Field. The majority of the habitat would be retained and viable populations of most of these invertebrate species would be maintained. Therefore the effect would be of slight local significance.

8.3.3 Construction would also cause the loss of areas of the M4 Road Verge and the Eastern Field. Both habitats have been assessed as supporting habitat of negligible

nature conservation value and the potential effect of construction is considered to be of negligible local significance.

8.3.4 Neither the Roundmoor Ditch or Cress Brook would experience a direct effect from the temporary motorway diversion. Given the existing poor water quality of both watercourses it is unlikely that road construction would result in any significant effect on water quality. Potential effects from run off are discussed in Chapter 14.0 Water Quality.

8.3.5 The construction access north of the motorway follows the line of the flood relief channel which runs across arable and improved fields of very minor nature conservation value. The route of the channel passes through the southern end of the Semi-natural Woodland and Hedgerow (Habitat H) which has been rated as a site of major local nature conservation value. Although the construction access would be required in advance of the construction of the flood relief channel, the access required for the temporary motorway diversion scheme would not result in any additional effects.

8.3.6 The construction access required for the diversion scheme to the south of the motorway would also follow the line of the flood relief channel and an access required for the construction of the MWEFAS scheme and therefore the temporary motorway diversion would not result in any additional effects.

Mitigation

8.3.7 Habitat loss would be mitigated by keeping the working corridors to a minimum width. Mitigation would also include maximum retention of the M4 Elm Copse, the Semi-natural Woodland and Hedgerow, and the Western Field which are habitats of intrinsic nature conservation value in their own right and represent important reservoirs of flora and fauna for the colonisation of habitats reinstated after construction of the temporary motorway diversion and the flood relief channel.

8.3.8 The effect on the Elm Copse (Habitat G) and the species it supports (protected from sale by statute) would be mitigated by replacement planting (*Figure 9.6*).

8.3.9 Measures to mitigate against run off are discussed in Chapter 14.0 Water Quality.

8.3.10 Prior to the construction of the Cress Brook crossing, a site survey with the Contractor would identify if any mature trees could be avoided in the construction of the access route within the available land.

8.4 Operational Effects and Mitigation

Operation

8.4.1 Within the general area there are a number of large mammal species, which may include Fox and Muntjaq Deer. Animals are likely to use overbridges and underpasses to pass from one side of the M4 to the other. Because animals would not be accustomed to the new carriageway, operation of the temporary motorway

diversion may result in an increase in road kills along this section of motorway. There is also the potential that a species protected by statute may be affected in this way (Confidential Species Report).

8.4.2 Potential effects on watercourses and mitigation are discussed in Chapter 14.0 Water Quality.

Mitigation

8.4.3 Measures to mitigate against protected species of animals crossing the carriageway are discussed in the Confidential Species report.

8.5 Decommissioning and Restoration

8.5.1 All materials and road surfacing brought into the study area would be removed. Topsoil would be replaced on the motorway embankments and on the eastern and western fields. The soil surface would be levelled and lightly harrowed. No fertiliser, lime or other soil preparation would be undertaken during the restoration process. This is especially important for grassed areas and the restoration of the Western Field. The lower the soil fertility, the more successful would be the restoration of species rich grassland. The Western Field would be left to regenerate naturally, recreating the existing habitat. In other areas, mitigation measures would aim to complement those proposed as part of the MWEFAS scheme. Replacement Wych Elm planting would compensate for the loss of the Elm trees along the M4 Elm Copse. In time the new Elm Woodland may recreate the habitat lost.

8.6 Summary of Effects

8.6.1 The temporary motorway diversion would not affect any SSSI's or sites of regional conservation value.

8.6.2 The temporary motorway diversion would result in the loss of part of an area of Wych Elm (M4 Elm Copse, Habitat G) which lies along the existing motorway. This area has been identified as a habitat of major local nature conservation value as the area supports a species protected from sale. The effect on this habitat would be moderate. Replacement planting would be a key mitigation measure.

8.6.3 The effect of the temporary motorway diversion on the rough grassland habitat of the Western Field (Habitat F) is of slight local significance due to the loss of part of this species rich invertebrate habitat. Appropriate reinstatement of the site would be carried out.

8.6.4 The construction accesses would not result in any effects additional to those of the flood relief channel.

8.6.5 Measures to mitigate potential effects on a second species protected by statute would be incorporated into the scheme.

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9.0 LANDSCAPE EFFECTS

The scheme would be unlikely to have a significant effect on the landscape due to the limited nature of the works and the existing landscape character and quality of the area. The main effect would be on properties in Glebe Close. This would be mitigated by provision of a visual barrier and replacement planting. The combined effects of the mitigation works and MWEFAS scheme fifteen years after reinstatement works would enhance the landscape character of the area.

9.1 Assessment Method

9.1.1 The landscape and visual impacts assessment is based on the recommendations in Part 5 of Section 3 of Volume 11 of the DMRB[1]. Reference was also made to the Countryside Commission's guidelines on Environmental and Landscape Assessment[16], and the Good Roads Guide (DMRB Volume 10)[17]. The assessment involved:

- A desk study to update existing data from work carried out for the M4 and MWEFAS schemes.
- A description of baseline conditions.
- A description of landscape character and quality.
- An assessment of landscape and visual impacts
- Identification of appropriate mitigation measures.

Landscape Classification

9.1.2 The classification and appraisal of landscape character and quality is vital for the assessment of the sensitivity of the landscape to change. The ability to accept change requires the assessment of all existing conditions including: the scale of the existing landscape; the extent of views; the variety of existing elements that either detract from or enhance the landscape and the compatibility of the existing and proposed landscape character. The assessment of landscape character is integrated with that of landscape quality.

9.1.3 Assessment of these features results in the classification of landscape character and quality in broadly homogeneous units.

9.1.4 Landscape quality was assessed using a five tier classification system that identifies areas of highest quality through to poor quality. These classifications were based upon the Countryside Commission guidelines as follows:

- Highest quality: dramatic features, especially of historic or ecological value, pleasing form and scale, fine and distant views, locally rare character, well managed, varied, harmonious, no poor features or views.

- Very Attractive: features of historic or ecological value, pleasing form and scale, good views, well managed, varied, harmonious, locally unusual character.

- Good: pleasing form and scale, attractive views, varied, well balanced, generally in character with area.

- Ordinary: similar to many other areas, views unexceptional, monotonous, some poor but not dominant features.

- Poor: out of character with surrounding rural areas, unattractive features or views, dereliction and neglect, poor or inappropriate buildings.

Visual Impact Assessment

9.1.5 The boundary of the existing visual envelope has been located by identification of estimated views during the winter months, of vehicles and lighting columns on the M4 between Marsh Lane and the Roundmoor Ditch from a height of 1.8m above ground level, within 1000m of the site. The visual envelope (*Figure 9.3*) identifies the approximate boundary from which the proposed temporary motorway diversion, lighting columns and vehicles would be seen.

9.1.6 The visual impact assessment considers the effects likely to be experienced from locations within and beyond the visual envelope of the proposed temporary motorway diversion. The assessment involves a comparison between the existing visual impact of the section of the M4 adjacent to the site, comparing it with the degree of change that the development would impose, both directly and indirectly on the landscape and visual amenity from properties, including first floor windows and outdoor locations. The assessment considers the likely effects:

- in winter, during the day and night during the construction of the temporary motorway diversion

- in winter, during the day and night during operation of the temporary motorway diversion

- in winter, during the day and night in the first year following decommissioning of the temporary motorway diversion and reinstatement of the existing motorway

- in winter and summer, during the day and night in the fifteenth year following reinstatement of the existing motorway.

9.1.7 The significance of the likely effects of the scheme on visual amenity were determined using the following criteria:

• No change:	no discernible deterioration or improvement in the existing view.
• Slight adverse or beneficial visual impact:	where the scheme would cause a barely perceptible deterioration (or improvement) in the existing view
• Moderate adverse or beneficial visual impact:	where the scheme would cause a noticeable deterioration (or improvement) in the existing view
• Substantial adverse or beneficial visual impact	where the scheme would cause a significant deterioration (or improvement) in the existing view

9.1.8 The results of the assessment are described in the text and shown in a Visual Impact Schedule (VIS), in Appendix 9.1.

Objectives for Landscape Mitigation

9.1.9 The objectives for landscape mitigation are to restore the landscape to an equal or improved level of landscape character, landscape quality, and visual impact of the motorway compared with the existing situation. Mitigation during the construction and operational periods should aim to reduce the short term and long term effects of the scheme by, for example, the erection of visual barriers. Mitigation proposals during the restoration period should take into consideration all phases of landscape works undertaken as part of this scheme, together with the MWEFAS landscape proposals.

9.2 Existing Conditions

General Location and Topography

9.2.1 The study area lies to the east of the River Thames within the Thames floodplain (*Figure 1.1*) between the urban areas of Maidenhead and Slough. The existing M4 lies in a generally flat landscape, subdivided by hedgerows and woodland, and the ground rises gradually towards Taplow Court 2km to the north west, which is at 60m AOD. Marsh Lane overbridge borders the site in the west as it rises 7m to cross the existing M4. The existing M4 embankment, at an approximate height of 2.0m above the surrounding ground level, forms the southern boundary of the site.

Existing Vegetation

9.2.2 Existing vegetation is illustrated on *Figure 9.1* and Photograph No. 2. The majority of vegetation associated with the site is located along the M4 northern embankment and Marsh Lane overbridge embankments. This consists of a dense, semi-mature tree belt between 3m - 6m in height, with Wych Elm, Ash, Hawthorn, Blackthorn and Field Maple species. Further east, beyond the tree belt, the existing vegetation along the M4 forms a Hawthorn hedgerow, of up to 3m in height.

9.2.3 The three properties located along Glebe Close have introduced a mixture of coniferous and deciduous trees and shrubs located along the road and garden boundaries which lie adjacent to the site.

9.2.4 Other areas of significant existing vegetation north of the existing M4 include a broken, clipped Hawthorn hedgerow approximately 2m in height, which forms the field boundary to the north of the site. This hedgerow contains two semi-mature Oak trees and a row of mature Willow trees, 7m - 10m in height which follow the line of the Roundmoor Ditch. Existing vegetation located to the north of Glebe Close forms a dense hedgerow and woodland. A public footpath passes along the eastern margin of the woodland.

9.2.5 Properties along the northern section of Marsh Lane are screened by dense garden vegetation located along their boundaries and along adjacent field boundaries.

9.2.6 The southern M4 embankment comprises a mixture of vegetation types and sizes. The vegetation between the Marsh Lane overbridge and the eastern end of the site consists of a broken Hawthorn hedgerow of between 1.5m and 2m in height. Between the Lot's Hole culvert and eastern end of the site immediately outside the highway boundary is a row of mature Lawson Cypress trees up to 8m in height. Other significant vegetation to the south of the M4, which provides some visual enclosure, is shown on *Figure 9.1*.

Landscape Designations

9.2.7 Landscape designations are illustrated on *Figure 16.1* The site and surrounding area lies within the Metropolitan Green Belt (MGB). The area immediately to the south of the site and existing M4, extending towards Dorney Reach, Dorney and Dorney Common, has been designated an Area of Attractive Landscape. A Local Landscape Area has been designated to the north of Glebe Close. The aim of these designations is to protect the local landscape from unsuitable developments which may affect landscape character. More information on these designations is provided in Chapter 16.

Landscape Character

9.2.8 The close proximity of the urban developments of Maidenhead and Slough, together with agricultural and market gardening practices and the existing M4, have significantly influenced the character and quality of the site. These influences have resulted in the following classifications of landscape character areas:

- Urban Landscape: This landscape contains the larger scale developments and high density elements of the urban environment

- Urban Fringe Landscape: The urban fringe landscape in the study area is interspersed by open plots of agricultural land which are overlooked by the adjacent urban development.

- Suburban-rural Landscape: The suburban-rural landscape is predominantly managed by agricultural practices, interspersed by hedgerows and woodlands which provide a medium scale, enclosed landscape of rural character, in an area that is still subject to the influences of urban populations.

9.2.9 The character of the site can be classified as a suburban landscape with rural characteristics, nestled between the two urban areas mentioned above. These urban developments are not visible from the site, as they are hidden behind ground undulations and vegetation enforcing the rural character. Only small groups of houses and occasional farmsteads are visible around the site, which is a fallow agricultural field, enclosed along all boundaries by vegetation (*Figure 9.2*).

9.2.10 Beyond the site to the north, the landscape contains a corridor of arable fields bordered by woodlands and hedgerows which visually combine to form a continuous wooded backdrop along the horizon and western edge of Slough.

9.2.11 To the south of the M4, agricultural land and meadows are located between the motorway, Court Lane and Dorney Court, an historic building within its own gardens and landscape setting. These fields and meadows are divided by the tree lined Cress Brook and Roundmoor Ditch, but otherwise have a more open character, compared with the land immediately to the north of the M4. Further south, beyond Dorney Court, the landscape opens up to a larger scale with few hedgerows and less vegetation. The uninterrupted pasture land stretches across the floodplain towards the River Thames approximately two kilometres away.

9.2.12 East of the site, and to the north of the existing M4, the agricultural landscape is more open in character with views towards West Town Farm and the occasional property on Lake End Road. The influence of the urban environment is clearly evident as, in the east, tall chimneys and industrial developments in Slough form the backdrop to this otherwise rural scene.

9.2.13 The southern part of Maidenhead is located to the west of the site, hidden from view behind vegetation that borders the agricultural fields and River Thames. The suburban-rural landscape character in this area is similar to the land immediately to the north of the site, as it is influenced by both agricultural practice and the urban environment.

Landscape Quality

9.2.14 The landscape quality of the area is generally good to ordinary, with few significant features of interest. To the south of the site, the historic setting associated with Dorney Court contains elements of an older and visually more attractive landscape set amongst mature trees within its own grounds, contributing to a locally higher landscape quality south of the site, as shown on *Figure 9.2*. The agricultural land immediately to the north of the M4 has been left fallow which has created an untidy appearance in an otherwise generally well maintained agricultural landscape of arable crops and market gardening.

9.2.15 This suburban-rural landscape would be capable of accepting a moderate to high level of change, despite being surrounded by the area of higher quality landscape, such as the designated Area of Attractive Landscape to the south of the site and Local Landscape Area to the north. This area has already been substantially influenced by the development of the existing M4 and associated structures and the site lies within a landscape that is visually contained within the existing field boundaries of woodland and hedgerows.

Visual Envelope

9.2.16 The existing visual envelope during winter has been estimated and the approximated boundary is illustrated on *Figure 9.3*. It identifies the boundary to views of the existing M4, its associated traffic and lighting columns, between Marsh Lane and the Roundmoor Ditch, within 1000m of the motorway. To the north of the M4, the visual envelope extends to the field boundaries adjacent to Marsh Lane. East of the site, the visual envelope is contained along the west and south sides of West Town Farm, and extends in a narrow arc towards the Tythe Barn and the B3026 overbridge located along Lake End Road.

9.2.17 Views to the motorway from the south are generally limited by existing vegetation on the southern embankment where the existing vegetation is of reduced height, or broken in extent.

Views to the M4 adjacent to the Site

9.2.18 Views towards the M4 from the north and west are illustrated on *Figure 9.3* and Photograph Nos. 1, 3 and 4 (*Figure 9.4*). Photograph No. 2 shows the area of the proposed temporary motorway diversion. Views towards the motorway from ground level and first floor windows of properties located along Glebe Close, Ye Meads, Marsh Lane and Lake End Road to the east are restricted by the tree belt and Hawthorn hedgerow located along the northern motorway embankment, together with other vegetation around the adjacent field boundaries. During the summer months this vegetation provides a partial visual screen between the Roundmoor Ditch and Cress Brook culvert, allowing intermittent views of vehicles as they pass along the motorway. The vegetation between the Cress Brook culvert and Marsh Lane overbridge is generally taller and more dense allowing restricted views of passing traffic. During the winter months it is likely that increased views

of traffic would be experienced from all locations as a result of the loss of leaf cover and visual permeability of the vegetation.

9.2.19 Views towards the M4 from the south , for example along Court Lane, are generally blocked by the combined screening effect of existing vegetation located adjacent to the highway boundary, along the Cress Brook and Ashford Lane in the area between the Roundmoor Ditch and Cress Brook culvert. During the winter months restricted views from Court Lane are likely to remain (*Figure 9.4*) as a result of the mature coniferous tree belt located adjacent to the M4. However, occasional glimpsed views in both winter and summer are experienced through gaps between these trees. Open views of the motorway are experienced from Dorney Reach, Marsh Lane, and the public footpaths to the south, as traffic passing along the carriageway is clearly visible from behind the broken hedgerow on the M4 embankment between the Cress Brook culvert and Marsh Lane area of the site.

9.3 Construction Effects and Mitigation

Construction

9.3.1 The existing vegetation to be retained is illustrated on *Figure 9.6*. During construction of the temporary motorway diversion, the main vegetation loss would be from the northern M4 embankment, where part of the dense tree and shrub planting would be removed. In addition, there would be loss of vegetation associated with the use of construction accesses, but this would not be greater than the loss of vegetation associated with construction of the MWEFAS channel.

9.3.2 During the construction period no additional vegetation would be lost from the area to the south of the existing motorway over that lost for construction of the MWEFAS channel.

9.3.3 The visual envelope for the proposed scheme is illustrated on *Figure 9.3*. It identifies the boundary from where the proposed temporary motorway diversion, lighting columns, and vehicles on the diversion, would be seen, from ground level (observer height 1.8m) within 1000m of the proposed diversion. The visual envelope does not take account of the possible contractors compound or construction accesses as there would be no effects over and above the loss of vegetation associated with construction of the MWEFAS channel.

9.3.4 During construction of the temporary motorway diversion the combination of vegetation removal, the presence of heavy construction machinery on and around the site, together with the continued existing flow of traffic along the existing M4 would result in adverse visual impact from a number of viewing positions (*Figure 9.5*) when compared with the existing situation. Arcs of view for the proposed temporary motorway diversion are illustrated on *Figure 9.4*.

9.3.5 During the construction period the majority of viewpoints located to the north of the site would experience slight adverse visual impact from gardens and first floor windows resulting from the removal of the vegetation screen from the motorway embankment.

9.3.6 The three properties and public footpath located along Glebe Close would experience slight to moderate adverse visual impact, compared with the existing situation. The combination of vegetation loss, construction activity and open views of traffic on the existing M4 would contribute to a slight increase in visual impact to The Badgers and West Town Farm and a moderate increase in visual impact to Ty Glas, September House and the public footpath.

9.3.7 Properties and viewpoints to the south of the existing M4 would not experience a discernible level of change in visual impact as a result of the temporary motorway diversion.

9.3.8 During the construction and decommissioning periods temporary floodlights may be used while work is being carried out on the crossover areas and these may lead to localised light spill.

Mitigation

9.3.9 All vegetation that is to be retained adjacent to the highway contractors working area would be protected by the erection of fencing throughout the construction period.

9.3.10 Mitigation measures during the construction period *(Figure 9.6)* would comprise a 2m high visual barrier on the northern verge of the temporary motorway diversion, between Marsh Lane overbridge and the western bank of the proposed MWEFAS channel. This would provide screening to properties in Glebe Close and would be erected before the temporary motorway diversion is open to traffic.

9.4 Operational Effects and Mitigation

Operation

9.4.1 Following the construction of the temporary motorway diversion, no further vegetation would be lost, other than that required for the construction of the MWEFAS flood relief channel.

9.4.2 Throughout the operational period, the temporary motorway diversion would result in a slight decline in overall landscape character and quality. The combination of vegetation loss, opening up of views, increased effect from the number of lighting columns and closer proximity of traffic to properties would all contribute to this decline.

9.4.3 The visual envelope for the operational period would be as for the construction period, illustrated on *Figure 9.3*. Visual impacts would also be similar.

9.4.4 Several properties located along Marsh Lane to the north of the site, West Town Farm and the Tythe Barn to the east would continue to experience slight adverse visual impact. Other properties and view points located to the north of the site and along Ye Meads would experience a slight reduction in visual impact in comparison

with the construction period, resulting from the mitigation measures introduced during the construction period. Overall, these properties would experience a situation of no discernible change from the existing.

9.4.5 Viewpoints located along Glebe Close would overall experience a slight reduction in adverse visual impact, compared to the construction period. This reduction would result from the erection of a visual barrier along the verge of the diversion. In comparison to the existing situation, there would be no discernible visual impact to The Badgers and slight adverse visual impact to Ty Glas. However, the visual impact to September House would remain as a moderate adverse effect.

9.4.6 The operational period would not cause a discernible change in adverse visual impact to properties and viewpoints south of the existing M4, therefore a situation of no change would exist.

9.4.7 The lighting to be provided for the temporary motorway diversion during its operation would be required to be of at least the same standard as the existing high pressure sodium lanterns. Lighting columns would be of a similar height to the existing ones on the M4 which would be disconnected during the operation of the diversion. Due to the distance between the temporary motorway diversion and the residential properties, there would be no increase in the effect of lighting on the residential properties, except those on Glebe Close which would experience a very slight increase over existing levels.

9.4.8 The results of the visual impact assessment have been recorded in Appendix 9.1, in the Visual Impact Schedule.

Mitigation

9.4.9 Proposed mitigation measures are illustrated on *Figure 9.6* and would be as described for the construction period. Provision of a 2m high visual barrier along the northern edge of the temporary motorway diversion would assist in mitigation, as the barrier would screen views of cars and the lower part of high sided vehicles from properties located along Ye Meads and Glebe Close. The barrier would replace existing screen planting lost and contribute towards mitigation of views of traffic and headlight glare as it passes along the temporary motorway diversion.

9.5 Decommissioning and Restoration

9.5.1 The level of visual impact to many properties and viewpoints during a winter day in the first year after decommissioning of the temporary motorway diversion, would be similar to those experienced during the operational period. The majority of distant viewpoints, both to the north and south of the site would experience no discernible visual impact. Other viewpoints would continue to experience a slight adverse visual impact, namely, properties located along Marsh Lane to the north, Tythe Barn to the north east and West Town Farm.

9.5.2 The relocation of the visual barrier along the M4 verge would result in similar levels of visual impact to properties and viewpoints at Glebe Close to the operational

period. In comparison with existing effects, a situation of no change would be experienced from The Badgers, slight adverse visual impact to Ty Glas and moderate adverse impact to September House.

9.5.3 Fifteen years after decommissioning of the temporary motorway diversion and reinstatement of the M4, there would be no discernible change in the level of visual impact either during the winter or summer when compared with the existing situation. This would apply to the majority of viewpoints, as proposed planting would reach similar heights and densities as the existing vegetation lost during the construction of the temporary motorway diversion.

9.5.4 In the area around Glebe Close, a slight beneficial change in visual impact would occur, resulting from the establishment of growth of the new Wych Elms planted to the south of these properties, adjacent to the public footpath. The results of the visual impact assessment have been recorded in Appendix 9. 1, in the Visual Impact Schedule.

9.5.5 The lighting provided for the reinstated M4 would be the same as the existing, therefore no additional visual impact would occur.

9.5.6 The character and quality of the landscape in the study area would improve with time following completion of the decommissioning and reinstatement works. This improvement would be brought about by the change in landscape character and quality, from a predominantly agricultural landscape of ordinary quality to a mixed landscape with woodland and river features. This landscape is anticipated to be of good quality as a result of the MWEFAS scheme. This change would provide increased visual interest and amenity value to the landscape character of the area.

9.5.7 Mitigation in the form of dense tree and shrub planting along the northern highway embankment and the erection of a visual barrier opposite Glebe Close are proposed (*Figure 9.6*). The aim of such proposals would be to replace vegetation lost during construction and help to integrate the existing motorway into the local landscape, by planting indigenous, native species. This, combined with the visual barrier and integration with the MWEFAS proposals would reduce the visual impact of the reinstated motorway.

9.6 Summary of Effects

9.6.1 The temporary motorway diversion would have a slight adverse effect on the landscape character and quality of the study area throughout construction and operation due to the existing influence of the M4 and the ability of the landscape to accept change. Properties in Glebe Close would also experience adverse effects due to their close proximity to the proposed temporary motorway diversion. The provision of a visual barrier would mitigate the immediate views of the diversion during construction and operation, and in the early reinstatement periods. Other properties within the study area presently experience a slight adverse effect from the existing motorway, but would experience a further slight increase in adverse visual impact during construction and operation. The visual impact of the proposed

temporary motorway diversion would be greatest during the construction period, resulting from the loss of screen vegetation and increased activity.

9.6.2 Following restoration and the establishment of planting, including the planting associated with the MWEFAS scheme, the overall visual impacts would be of slight beneficial impact or a situation of no change. The combined effects of the mitigation works and MWEFAS scheme fifteen years after reinstatement works would enhance the landscape character of the area.

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10.0 LAND USE

The scheme would be unlikely to have a significant effect on land use due to the limited nature of the works, existing land use and temporary nature of the scheme. The main effect would be temporary loss of a small area of agricultural land. This would be restored to its former use afterwards. There would be no residual effects.

10.1 Assessment Method

10.1.1 The objective of the land use assessment was to determine the significance of the effects arising from the proposed scheme on relevant features within the study area.

10.1.2 The basic methodology adopted for the assessment was based on the recommendations in Part 6 of Section 3 of Volume 11 of the DMRB[1] and involved:

- A desk study to check and update existing data obtained from the M4 and MWEFAS schemes.
- Site survey.
- An assessment of the effects and determination of the significance of the proposed scheme on private property.
- An assessment of the effects and determination of the significance of the proposed scheme on agricultural land.
- A review of South Bucks Local Plan[18] to identify any land within the study area zoned for future development.
- Identification of appropriate mitigation measures.

10.1.3 The significance of the likely effects of the scheme on land use was determined using the following criteria:

- None: no effect
- Slight: localised effect of low magnitude, or a temporary effect
- Moderate: effect on a wider area and/or in a more sensitive location.
- Severe: an irreversible effect on land use, a large area or number of people affected, and/or in a very sensitive location.

10.2 Existing Conditions

10.2.1 Land use in the study area (*Figure 6.1*) immediately adjacent to the location of the temporary motorway diversion comprises: three residential properties along Glebe

Close, just off Marsh Lane; an area of rough ground between the properties and the motorway boundary; and a field which is currently not in agricultural production, lying fallow following a vegetable crop. Much of the land within the study area is agricultural land. It is of high quality, being classified as mainly Grade 2 land, and is mainly used for arable or market gardening purposes. Crops grown include barley, fruit and vegetables.

10.2.2 There are further areas of housing on the western side of Marsh Lane adjacent to the north side of the motorway, at Dorney Reach on the southern side of the motorway and along Lake End Road on the eastern edge of the study area. Just on the western edge of the study area there is a school (Dorney County Primary School), a village hall and Trumpers Field, a recreation ground. There is a band of dense tree and shrub vegetation which lines both sides of the highway boundary, and a small woodland to the north of September House, at the end of Glebe Close.

10.2.3 There is no land within the study area which has been designated as development land.

10.3 Construction Effects and Mitigation

Construction

10.3.1 There would be no demolition of property or landtake from gardens during the construction period. There would be no effect during construction on land used by the local community. The three residential properties at Glebe Close would be moderately affected during the construction period due to noise and visual intrusion due to the loss of vegetation screening the north side of motorway.

10.3.2 During construction there would be a small amount of landtake from the rough grassland and the agricultural field which is of slight significance. An area of 1.25 hectares of Agricultural Land Classification (ALC) Grade 2 land would be directly affected by the scheme, 1.06 hectares of this forms part of West Town Farm. The agricultural activity would not be significantly affected as the land in question forms a relatively small part of the holding of West Town Farm (approximately 127 hectares in total).

10.3.3 The construction accesses required for the temporary motorway diversion scheme would follow the line of the flood relief channel and an access required for the construction of the MWEFAS scheme and the diversion scheme would therefore not result in any additional effects.

Mitigation

10.3.4 The effects on land use during construction would be mitigated by providing an environmental barrier along the edge of the temporary motorway diversion which would reduce the visual impact on the three properties at Glebe Close.

10.3.5 Access to fields across the construction accesses would be maintained.

10.3.6 Vegetation loss would be mitigated by keeping the working corridors to a minimum width. The area covered by the planning application for the flood channel and the temporary motorway diversion would be fenced off during construction to prevent land being affected outside the boundaries.

10.4 Operational Effects and Mitigation

Operation

10.4.1 The diversion is a temporary feature which would be in place for about a year. However, the implications for land use during operation would be similar to those where the structure would be permanent. The housing at Glebe Close would not be directly physically affected by the presence of the temporary motorway diversion, but would experience increased visual intrusion (as described in more detail in Chapter 9).

10.4.2 Approximately 1.25 hectares of Grade 2 agricultural land would be lost whilst the temporary motorway diversion is in place. This would be a very slight effect (the area farmed by West Town Farm was approximately 127 hectares in September 1992), and it is anticipated that there would be no effect on the commercial viability of West Town Farm. Of the 1.25 hectares, 0.19 hectares would be lost from the area of rough ground, but is again only of very slight significance.

Mitigation

10.4.3 Whilst the temporary motorway diversion is in place an environmental barrier would provide screening for the housing to minimise visual intrusion. Agricultural land still under cultivation and adjacent areas of woodland would be fenced off for protection.

10.5 Decommissioning and Restoration

10.5.1 Land would be restored to its previous use. However, some of the land falls within the area identified for the landscaping of the new flood channel (*Figure 9.6*).

10.6 Summary of Effects

10.6.1 There are no properties which would experience loss of land within their curtilage. A small amount of agricultural land would be temporarily lost during the construction and operation phases and would be restored back to its former use after completion of the scheme. The construction, operation and decommissioning of the temporary motorway diversion would have only a minor effect on land use in the study area.

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11.0 TRAFFIC NOISE AND VIBRATION

Traffic noise and vibration would be unlikely to have a significant effect, due to the limited nature of the works, proximity to the existing M4 and temporary nature of the scheme. The residential properties nearest to the diversion would experience an imperceptible decrease in motorway traffic noise and changes in vibration levels would not be of significance.

11.1 Assessment Method

11.1.1 The objective was to undertake an assessment to determine the significance of the effects arising from the proposed temporary motorway diversion on noise levels within the study area.

11.1.2 Traffic noise issues associated with the proposed temporary motorway diversion were:

- The effect of noise from motorway traffic using the temporary motorway diversion
- The effect of traffic noise using the M4 motorway once the new bridge has been completed and the temporary motorway diversion removed.

11.1.3 The traffic noise effects can be assessed by carrying out a comparative study i.e. comparing the calculated traffic noise levels for 11.1.2 above and comparing the results with the calculated traffic noise levels for the existing situation.

11.1.4 Traffic noise level calculations have therefore been undertaken for a sample of the nearest residential properties for the following scenarios:

- existing situation i.e. unaltered motorway in 1996, the year just prior to the temporary motorway diversion; and
- diverted motorway in 1997.

11.1.5 All traffic noise calculations have been carried out in accordance with the Department of Transport Memorandum 'Calculation of Road Traffic Noise' (CRTN)[9]. CRTN forms the basis for assessing the effect of traffic noise associated with new and altered roads as specified in Volume 11 of the 'Design Manual for Roads and Bridges' (DMRB)[1]. Refer to Appendix 7.1 for explanations of noise characteristics and units.

11.1.6 As the noise calculations result in numerical values of change in traffic noise level the significance of the effect may be represented by grouping the numbers of properties affected within specified ranges, i.e.: 1-3dB$L_{A10(18hr)}$, 3-5dB$L_{A10(18hr)}$. Changes in noise level of less than 1dB$L_{A10(18hr)}$ are considered insignificant.

11.1.7 Traffic noise levels have been evaluated using the 'Roadnoise' computer program which uses a 3-dimensional computer model of the site as a basis for undertaking traffic noise calculations. The Roadnoise program evaluates traffic noise levels strictly in accordance with the CRTN calculation method.

11.1.8 The CRTN method calculates a noise level at a position 1m outside the window of relevant façades of a building which is exposed to traffic noise. The calculation is carried out in two stages. Firstly, the noise level produced by the road is calculated for a reference point 10m from the edge of the carriageway. This takes into account the number of vehicles using the road, the percentage of heavy vehicles, the speed of traffic, the gradient of the road and the type of road surface. Secondly, the noise level at the relevant façade is calculated taking into account the distance from the road, the type of intervening ground, the presence of any screening, the orientation of the building façade and any reflection effects. The CRTN method requires traffic noise levels to be calculated as façade L_{A10} (18 hr) values over the period between 0600-2400 hours.

11.1.9 Any effect which environmental barriers, proposed for visual purposes, may have on traffic noise has not been taken into account in the calculations.

11.2 Existing Conditions

11.2.1 Road traffic noise levels for the existing motorway alignment in the year 1996, immediately prior to the construction of the proposed temporary motorway diversion, have been calculated using the method given in the CRTN. Based on observed data, the 18hr mean traffic speed of 92 kph has been adopted for the calculations. The predicted noise levels, given in decibels and in terms of $18hrL_{A10}$, at ground floor level for a sample of the nearest residential properties are shown in Table 11.1. The properties are identified on *Figure 5.1*. The nearest houses to the proposed temporary motorway diversion are located in Glebe Close. There are no particularly sensitive locations such as hospitals, churches and schools in the immediate vicinity. The values shown in Table 11.1 represent relatively high levels of traffic noise. Motorway traffic noise dominates the noise climate of the area.

Table 11.1 Traffic Noise Levels: Existing Situation

Location	Façade	Traffic Noise Level in L_{A10} (18 hr)
1 Glebe Close	SE NE	70.1 dB(A) 66.0 dB(A)
2 Glebe Close	S E	70.5 dB(A) 68.2 dB(A)
3 Glebe Close	S E	70.5 dB(A) 70.4 dB(A)
7 Old Marsh Lane	SE	71.1 dB(A)
19 Marsh Lane	NW	64.6 dB(A)

11.3 Operational Effects

11.3.1 Traffic noise calculations have been carried out for the motorway in 1997 when the temporary motorway diversion is likely to be in operation. As the diversion would be subject to a speed limit of 50mph, a mean speed of 80kph has been adopted for the calculations as recommended in CRTN. The predicted noise levels for a sample of the nearest residential properties are shown in Table 11.2 together with the calculated traffic noise levels prior to the temporary motorway diversion.

Table 11.2 Traffic Noise Levels : Motorway with Temporary Diversion

Location	Façade	Existing Traffic Noise Level in L_{A10} (18 hr)	Traffic Noise with Diversion in L_{A10} (18 hr)	Change (+/-)
1 Glebe Close	SE	70.1 dB(A)	69.6 dB(A)	-0.5
	NE	66.0 dB(A)	65.5 dB(A)	-0.5
2 Glebe Close	S	70.5 dB(A)	70.3 dB(A)	-0.2
	E	68.2 dB(A)	67.9 dB(A)	-0.3
3 Glebe Close	S	70.5 dB(A)	69.8 dB(A)	-0.7
	E	70.4 dB(A)	70.0 dB(A)	-0.4
7 Old Marsh Lane	SE	71.1 dB(A)	70.3 dB(A)	-0.8
19 Marsh Lane	NW	64.6 dB(A)	63.7 dB(A)	-0.9

11.3.2 The results in Table 11.2 indicate that residential properties near to the proposed temporary motorway diversion would experience imperceptible decreases in motorway traffic noise - a maximum decrease of 0.9dB(A) has been calculated. This is because although the temporary motorway diversion would be closer to the properties than the existing motorway the traffic would be slower. According to Part 7 of Section 3 of the DMRB, some people may perceive disbenefits if traffic noise increases by as little as 1 dB(A). However, the DMRB treats changes in traffic noise levels between the range <-1 to <+1 dB(A) as denoting no significant change. Thus, the calculated decreases of up to 0.9 dB(A) at some residential properties, which would not be discernible to the human ear, are insignificant in terms of noise effect.

11.3.3 After the decommissioning of the temporary motorway diversion traffic noise levels would be the same as if the scheme had not been undertaken.

11.4 Vibration Effects

11.4.1 Traffic vibration is a low frequency disturbance producing small movements in buildings which can be felt by their occupants. Vibration can be transmitted either through the ground or the air.

11.4.2 Ground borne vibrations due to traffic are generated by irregularities in the road surface and so are unlikely to be important when considering disturbance from newly

constructed roads. Any potential vibration would attenuate with distance from the motorway. Ground borne vibration levels from the proposed temporary motorway diversion are expected to be imperceptible at the nearest residential properties.

11.4.3 Air borne vibration from traffic is low frequency noise which can be generated by engines or exhausts of road vehicles with dominant frequencies below 100 Hz. In the DMRB it is stated that recent surveys have found that there is a correlation between traffic noise nuisance and air borne vibration nuisance. The $L_{A10,\ 18\ hour}$ index was among the physical variables most closely associated with average vibration disturbance ratings. As there would be no increases in traffic noise levels at the residential properties it is expected that there would be no increase in air borne vibration.

11.5 Summary of Effects

11.5.1 The nearest residential properties to the proposed temporary motorway diversion would experience very slight decreases in traffic noise levels of up to 0.9 dB(A). The DMRB treats changes in traffic noise levels between the range <-1 to <+1 dB(A) as denoting no significant change. Thus changes in traffic noise levels would not be discernible to the human ear and would be insignificant in terms of noise effect.

11.5.2 Changes in vibration levels at nearby properties due to traffic on the temporary motorway diversion would not be of significance.

11.5.3 After the decommissioning of the temporary motorway diversion traffic noise levels would be the same as if the scheme had not been undertaken.

12.0 PEDESTRIANS, CYCLISTS, EQUESTRIANS AND COMMUNITY EFFECTS

The scheme would be unlikely to have a significant effect on pedestrians, cyclists, equestrians and the community due to the limited nature of the works and limited number of rights of way and community facilities in the area. The main effects would be a slight reduction in amenity for three footpaths. Access would be maintained throughout all phases of work. There would be no residual effects

12.1 Assessment Method

12.1.1 The objective was to undertake an assessment to determine the significance of the effects arising from the proposed scheme on pedestrians, cyclists, equestrians and the community.

12.1.2 The methodology adopted for the assessment was based upon the recommendations given in Part 8, Section 3 of Volume 11 of the DMRB[1] and involved:

- A desk study to check and update existing data already held for the MWEFAS and M4 (4b-8(9)) schemes.
- Identification of rights of way and community facilities in the study area.
- Assessment of the effects and determination of the significance of the scheme on rights of way and community facilities and their users.
- Identification of appropriate mitigation measures.

12.1.3 The significance of the likely effects of the scheme was determined using the following criteria:

- None: no effect.
- Slight: localised effect, small change in amenity.
- Moderate: journey length and travel pattern noticeably affected.
- Severe: footpath closed, journey length and travel patterns considerably affected for large numbers of people.

12.2 Existing Conditions

12.2.1 There are no long distance footpaths or cyclepaths within the area. Public footpaths and bridleways within the study area are shown on *Figure 6.1*. Footpath 23 runs to the south of Glebe Close, and connects with Footpath 18 running northwards to Marsh Lane skirting the woodland to the north of Glebe Close. Both footpaths appear to be little used. To the west of Marsh Lane Footpath 21 runs from Marsh

Lane to Old Marsh Lane through a small group of houses. Bridleway 19 runs from Old Marsh Lane west to the edge of the River Thames. Footpath 22 runs alongside the southern edge of the motorway between Marsh Lane and Oak Stubbs Lane. To the south of the study area Bridleway 5 follows Ashford Lane and continues across agricultural land to Marsh Lane at Dorney Reach as Footpath 5. Footpath 1 runs south east from Footpath 5 to Dorney.

12.2.2 Dorney County Primary School, Trumpers Field, a recreational area and Dorney Village Hall are located to the south west of the temporary motorway diversion at Dorney Reach.

12.3 Scheme Effects and Mitigation

Construction

12.3.1 During the construction, access along Footpaths 18 and 23 would be maintained, although there would be a slight reduction in visual and aural amenity as a result of construction activity. No other rights of way or community facilities would be affected.

Operation and Restoration

12.3.2 Access would be retained along Footpaths 18 and 23. There would be a slight reduction in visual and aural amenity. There would also be a slight effect on the visual and aural amenity of Footpath 5 due to activity during the construction of the underbridge, whilst the temporary motorway diversion is in operation. There would be no effect on community facilities .

12.3.3 Following construction of the flood relief channel, Footpath 18 would follow a slightly diverted route which would cross the flood channel on a foot bridge.

Mitigation

12.3.4 Access would be maintained along Footpaths 18 and 23 during all phases of work, and gates or stiles would be provided if fences are to be crossed.

12.4 Summary of Effects

12.4.1 Access would be maintained along Footpaths 18 and 23 throughout the scheme and gates or stiles would be provided if fences are crossed. Due to the construction activity there would be some reduction in the visual and aural amenity of footpaths. Due to the temporary nature of the scheme this is not considered significant. There would be no effect on community facilities.

13.0 VEHICLE TRAVELLERS

The scheme would be unlikely to have a significant effect on vehicle travellers due to the limited nature of the works and temporary nature of the scheme. The main effect would be the opening up of views to the north until vegetation establishes. Driver stress would remain high. Appropriate use of lighting, signs and road markings would keep driver stress close to existing levels and would maintain operational safety. There would be no long term effects.

13.1 Assessment Method

Views from the Road

13.1.1 Views from the road have been assessed in accordance with the guidelines suggested for a Stage 3 assessment in Part 9 of Section 3 of the DMRB[1] and focus upon the travellers ability to view the surrounding landscape.

13.1.2 The assessment of views from the road takes into consideration the type of scenery, landscape character and quality, the extent to which travellers may be able to view the scene and features of particular interest or prominence in the view, whether good or bad, during the summer and winter months. The assessment takes into consideration the effect of vegetation growth of trees and shrubs including any proposed landscape work. It should be noted that a winter survey was not undertaken and therefore all winter views experienced have been estimated.

13.1.3 Four categories are used to describe the extent to which the travellers perceive the landscape through which they are passing. These are:

- No View: contained by earth bunds, environmental barriers or adjacent structures, or dense vegetation.
- Restricted View: frequent structures or vegetation blocking the view.
- Intermittent View: road generally at ground level but barriers or screening vegetation at intervals.
- Open View: view extending over many miles, or only restricted by the existing landscape features.

13.1.4 There is no classification provided of the significance of the change in views resulting from the temporary motorway diversion, as it is considered that, in the long term, there would be no significant changes in views. This is due to the intended reinstatement of embankment planting and the provision of a visual barrier.

Driver Stress

13.1.5 Driver stress (defined as "the adverse mental and physiological effects experienced by a driver traversing a road network") has been assessed in accordance with the guidelines for a Stage 3 assessment in Part 9, Section 3 of DMRB.

13.1.6 Driver stress is caused by three main components; frustration, fear of potential accidents and uncertainty relating to the route being followed. Frustration is caused by the inability to travel at a speed expected for the road standard, causing the driver to experience a feeling of not being in control of the journey, especially where time is a factor. Fear can be caused by presence of other vehicles (in terms of volume and distance of traffic), inadequate sight distances, inadequate lighting, narrow lanes, roadworks and poor condition of road surface. Fear tends to be higher where speed, flow and proportion of heavy vehicles are high and during poor weather conditions. Route uncertainty is caused primarily by poor signing and road markings.

13.1.7 The categories used to describe the significance of driver stress are:

- Low: Route does not cause frustration, fear or uncertainty under normal conditions.
- Moderate: Some frustration, fear and/or uncertainty is experienced by drivers but over a short distance/time scale and not to a level that would cause severe stress.
- High: Frustration, fear and/or uncertainty is experienced by drivers over a sustained distance/timescale.

13.2 Existing Conditions

Views from the Road

13.2.1 The existing M4 passes through suburban-rural landscape surrounded by agricultural land of ordinary quality, on an embankment, which has an average height of 2.0m. It is bordered by trees and shrubs of varying sizes, which in summer restrict views from the road. Travellers in lorries and coaches have more extensive views than those in cars, and winter views are more extensive for all vehicle travellers, as the leafless vegetation allows views on to the adjacent land or over a longer distance to the north and south.

13.2.2 Travelling eastbound from the Marsh Lane area towards Lot's Hole culvert, views to the north during the summer months are restricted by a dense barrier of tree and shrub planting of up to 6m in height. During the winter months restricted views through the leafless vegetation across properties located on Glebe Close would be experienced. In the same area looking south, vehicle travellers in cars experience intermittent views through gaps in the existing embankment vegetation, between 1.0m and 2.0m in height above road level. These views are across the agricultural

field located between Marsh Lane and the tree lined Cress Brook, towards Dorney Court, the Thames floodplain and properties at Dorney Reach. In the same area, travellers in lorries and coaches would experience open views, including extended views across the floodplain, towards the Windsor Forest. During the winter months views would be more extensive for all vehicle travellers.

13.2.3 Travelling east between Lot's Hole culvert and the Roundmoor Ditch, in the summer, views to the north from cars are restricted by the presence of a Hawthorn hedgerow, 2.0m to 3.0m in height above road level. Views from lorries and coaches in this area are intermittent long distance views across the agricultural fields towards Taplow Court and the backdrop of trees that line the A4. In winter intermittent views would be experienced by travellers in cars.

13.2.4 Looking eastwards from Cress Brook culvert, the industrial developments of Slough can be seen by all travellers through gaps between the trees that line the Roundmoor Ditch. In winter these views become more extensive. To the south, views are restricted in both the winter and summer by a row of mature Lawson Cypress trees, although there are some intermittent views between occasional gaps in the trees.

13.2.5 Westbound views down the existing M4 are restricted to the motorway corridor, as vegetation along the highway boundary prevents oblique views out.

Driver Stress

13.2.6 Using the peak hour observed flows for the design year, with the associated percentages of heavy vehicles, unit flows have been calculated.

13.2.7 According to the guidance notes from the DMRB (see Table 13.1) traffic volume and speed would indicate high driver stress on the existing carriageway under normal operating conditions (see Table 13.2) as lane flows are all over 1600 flow units per hour and speeds range from under 75 to 94 kilometres per hour (kph) during the peak hours.

Table 13.1: DMRB Guidance for Motorway Driver Stress

Flow Units/Hour*	Average Speed kph		
	Under 75	75-95	Over 95
Under 1200	High	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High

* Average Peak Hourly Flow per Lane in Flow Units Per Hour, a vehicle under 1.5 tons is one flow unit, vehicles over 1.5 tons are three flow units

Table 13.2: M4 Carriageway Flow/Speed During the Peak Hour

Peak Hour	Flow Units/Lane	Average Speed
AM Eastbound	2514	53kph
AM Westbound	1882	92kph
PM Eastbound	1936	94kph
PM Westbound	2307	83kph

13.3 Construction Effects and Mitigation

Construction

Views from the Road

13.3.1 Part of the existing vegetation would be lost from the northern embankment of the existing M4 during the construction period, opening up views to the north across the suburban-rural landscape of ordinary quality. These would be open, panoramic views across the agricultural fields towards the properties located along Glebe Close and Marsh Lane. Views to the south during the construction period would be as the existing views.

Driver Stress

13.3.2 During construction of the temporary motorway diversion the existing carriageway would have some lane closures at night. Due to the low flows at night and the short distance this should not create increased driver stress.

Mitigation

13.3.3 Where lanes are closed at night appropriate lighting, signs and road markings would be used to reduce driver stress and to maintain operational safety.

13.4 Operational Effects and Mitigation

Operation

Views from the Road

13.4.1 From the eastern end of the new carriageway, views to the north from cars would be prevented by the proposed 2.0m high visual barrier. Travellers in lorries and coaches would see over the barrier and experience open views, similar to those in the construction period. Beyond the end of the visual barrier, open views would be experienced from cars.

13.4.2 Views to the south of the temporary motorway diversion during winter and summer would be similar to the existing views for all vehicle travellers although they would also include views across the existing M4 carriageway.

13.4.3 There would also be a glimpsed view through the area of vegetation removed as part of the underbridge construction, towards Dorney Court in the south.

Driver Stress

13.4.4 Traffic would leave the existing carriageway and temporarily travel on the diversion (for approximately 700m) before rejoining the existing carriageway. The lane numbers would remain constant, the lane widths would become narrower. The speed limit would be a mandatory 50mph (80.5kph). All current safety standards for traffic management signs and marking (including Chapter 8 of the Traffic Signs Manual - DOT[19]) would be adopted.

13.4.5 With the provision of warning signs and lane markings the transition to and from the temporary motorway diversion would reduce the physical and emotional tension that can result from poor driver anticipation with regard to lane selection. The level of driver stress would remain high as a result of the temporary motorway diversion and with provision of warning signs and lane markings stress would be expected to remain close to existing levels.

13.4.6 There would be a temporary reduction in the severity of potential accidents due to lower speeds but a possible increase in the number of incidents due to the temporary layout.

Mitigation

13.4.7 Lighting would help to reduce any driver stress created by the temporary motorway diversion in terms of fear and route uncertainty at night and would be consistent with the adjacent M4. Speed would be a mandatory 50mph and all safety standards including signs and marking would be provided.

13.5 Decommissioning and Restoration

Views from the Road

13.5.1 Vehicle travellers would return to the M4 and views northwards would be similar to views during the construction period. The re-erection of the 2.0m high visual barrier along the northern edge of the M4 embankment at the eastern end would prevent views from cars. Views would be obtained of construction activity of the flood relief channel for the MWEFAS scheme.

13.5.2 Views to the south during decommissioning and restoration works would be similar to those in the operational period.

13.5.3 The proposed highway planting along the northern embankment combined with landscape proposals undertaken for the MWEFAS scheme, would in time, grow to form a significant visual barrier. After approximately fifteen years, intermittent views would be glimpsed from lorries and coaches across the flood relief channel. Vehicle travellers in cars would experience no views northwards in the Marsh Lane area, and glimpsed views across the landscape, from the M4 underbridge area.

During winter intermittent views through the leafless vegetation bordering the motorway would be experienced to the north.

13.5.4 Views to the south in the Marsh Lane area, after fifteen years, would remain as intermittent, becoming more restricted as the existing highway vegetation matures. Glimpsed views would be gained across the flood relief channel from the M4 underbridge only, which by this stage would be bordered by established tree and shrub planting.

Driver Stress

13.5.5 During decommissioning and restoration the level of driver stress would return to the existing levels as traffic returns to the existing carriageway.

13.6 Summary of Effects

Views from the Road

13.6.1 With the exception of the eastern end of the scheme where the visual barrier would prevent views, the removal of part of the existing vegetation located along the northern embankment would result in open views north of the existing motorway across the suburban-rural landscape until proposed tree and shrub planting has established. Following maturity of this planting and that associated with the MWEFAS scheme, the views would be similar to those experienced at present.

Driver Stress

13.6.2 Driver stress would remain high during construction. Appropriate use of lighting, signs and road markings would keep driver stress close to existing levels and would maintain operational safety.

14.0 WATER QUALITY AND DRAINAGE

The scheme would be unlikely to have a significant effect on water quality and drainage due to the limited nature of the works. The main effects would be the potential for sediment runoff and spillages during construction and decommissioning. This would be mitigated by use of sediment traps and drainage. During operation the main effects would be the potential for pollution and increased runoff to watercourses. These would be mitigated by use of a drainage system. Following restoration, more runoff would be discharged to Roundmoor Ditch than at present, but less to Cress Brook. This would result in a minor increase in flood risk to the Roundmoor Ditch.

14.1 Assessment Method

14.1.1 The objective of this assessment was to determine the significance of the effects arising from the proposed scheme on water quality and drainage.

14.1.2 The methodology for the assessment was based on the recommendations in Part 10 of Section 3 of the DMRB[1] and involved:

- A desk study to check and update existing data from the M4 (4b-8(9)) and MWEFAS schemes.
- Chemical and biological analysis of water samples taken from watercourses to provide an indication of baseline conditions.
- An assessment of the effects and determination of the significance of the proposed scheme on water quality and drainage.
- Identification of appropriate mitigation measures.
- Consultation with the Regulatory Authority.

14.1.3 The potential effect of the temporary motorway diversion has been assessed based upon the details and design of the construction, in particular, the provision of drainage facilities during all phases of the scheme. The significance of the effects upon drainage will depend upon the degree to which the hydrological regime of the watercourses is affected.

14.1.4 The significance of the likely effects of the scheme on water quality and drainage was determined using the following criteria:

- None: no effect upon water quality and drainage
- Minor: an effect which may be mitigated against, resulting in little residual effect of relevance to water quality or drainage

- Moderate: detrimental effect upon the water quality and/or drainage of the study area which is temporary or short term, localised, or may be mitigated by the provision of suitable drainage provisions

- Severe: a lasting effect upon the water quality or drainage of a large proportion of the study area which cannot be mitigated.

14.1.5 The relatively short-term nature of this particular project means that it is unlikely there would be any severe effects, as defined above.

14.2 Existing Conditions

Surface Water

14.2.1 There are two watercourses in the study area; the Roundmoor Ditch and the Cress Brook (*Figure 14.1*). Both flow in a southerly direction and are small tributaries of the River Thames. They are classed as main rivers by the Environment Agency. Roundmoor Ditch is classified by the Environment Agency as a Class F watercourse (very poor quality) and Cress Brook a Class E watercourse (poor quality).

14.2.2 Cress Brook is an ephemeral stream which dries up during the Summer months. Its chemical composition displays high pH (alkaline) and high levels of calcium. Cress Brook emerges immediately to the south of the motorway, although on the northern side of the highway there is a small depression along the line of the stream. A culvert exists underneath the motorway immediately upstream of the source of the Cress Brook at Lot's Hole. During a site visit on 23rd January 1995, undertaken as part of the M4 Scheme, it was noted that the culvert contained water which appeared to be motorway runoff, however, during site visits undertaken on 25th April and 13 July 1995, the culvert was dry, and consequently water quality sampling was not possible.

14.2.3 The Cress Brook receives flood flows from the Thames during periods of high flows, which may lead to flows from the spring source by the motorway backing up and flooding the areas around Dorney Reach. Water quality results from Cress Brook during the M4 study were high in hardness, alkalinity and calcium, and reflect the geology through which the stream flows.

14.2.4 Roundmoor Ditch is at the eastern end of the study area. In addition to receiving runoff from the motorway, it also receives discharges from Burnham Sewage Treatment Works (STW), upstream of the motorway (NGR SU 919809).

14.2.5 Results of invertebrate sampling of the Roundmoor Ditch by the former NRA in March 1992, and as part of the M4 Scheme in January 1995, indicates poor water quality in the Roundmoor Ditch, indicative of sewage pollution. Biological water quality sampling was undertaken on the Roundmoor Ditch (13 July 1995), 7m upstream of the M4. The Ditch was observed to have an even flow and depth (10-20 cm) and was based on thick anaerobic silt. There was evidence of sewage fungus in the channel. No submerged or emergent vegetation was recorded. As a consequence of the depth of silt a 'kick sample' was not possible, instead, a three minute sweep sampling method was therefore employed from the bank edge. The sweep involved

skimming the surface of the channel bed and the bank edge, avoiding netting too much silt. The sample was fixed in formaldehyde and sorted and identified in the laboratory, and was scored using Biological Monitoring Working Party (BMWP) classification. Only two families of invertebrate were recorded : Oligochaeta and chironomidae. The sample had a BMWP score of 3 (as for the January 1995 M4 Scheme sampling) indicating a river of very poor water quality. A number of pollution incidents have occurred in this watercourse in the past and the Environment Agency consider this watercourse to be of low ecological value.

14.2.6 The water quality of the Roundmoor Ditch is likely to be significantly affected by discharges from Burnham STW, particularly during periods of high flow when storm flows enter the sewage works and pass directly to the Ditch. This is reflected in chemical water quality results for this watercourse. Archive data from the Environment Agency demonstrates that the biochemical oxygen demand (BOD) of the Roundmoor Ditch downstream of Burnham STW generally varies between 0 and 20 mg/l. This is supported by samples collected in January 1995 as part of the M4 Scheme Water Quality Survey and in July 1995 which recorded BOD levels of 3.3 and 4.1 mg/l.

Groundwater

14.2.7 The geology of the study area is predominated by the River Gravels of the Middle Thames Valley, which are classified by the former NRA as a Major Aquifer in their document 'Policy and Practice for the Protection of Groundwater - Regional Appendix Thames Region'[20]. This means that these aquifers are highly permeable and may be highly productive and able to support large abstractions for potable water supply and other purposes. In the study area, the river gravels are 3-9 metres thick and are in hydraulic continuity with surface waters and therefore, much of the water abstracted from the gravels originates from the river. Since permeability of the gravels is generally high, there is a high susceptibility to groundwater pollution from surface activities. The soil type in the study area is defined as 'Sutton 2' under the Soil Survey of England and Wales Classification[21]. This is a river terrace gravel, well drained and often of a calcareous mix. This suggests that the soil will provide groundwater with little protection against pollution from surface activities. In the above document the former NRA state that the resources within the river gravels of the Middle Thames Valley are being increasingly utilised, therefore it is likely that the protection of this aquifer will be an important consideration.

14.2.8 The Water Resources Act 1991[22] requires that a licence be obtained before water can be abstracted from ground or surface water resources for uses other than domestic. Abstraction licences are held on statutory public registers, but do not include those abstractions for domestic purposes. There are a number of licensed abstractions in the area of the temporary motorway diversion, as shown in Table 14.1, below, and highlighted on *Figure 14.1.*

14.2.9 The most sensitive abstractions are those for public water supply which comprise of wellfields straddling the M4, near the River Thames at Bray and Dorney. Because of the hydraulic continuity between surface and groundwaters, much of the water

abstracted here is from the Thames, although some will inevitably be drawn from the aquifer itself.

Table 14.1 Details of Groundwater Abstractions

Map Ref	Licence Holder/ Location	NGR	Distance from M4 Diversion	Licensed Volume	Aquifer	Use
1	Water Oakley Farm	SU 909 787	1.5 km	0.7 Ml/d	Gravels	Spray Irrigation
2	Mid Southern Water	SU 914 787 (grouped)	1.15 km	27.3 Ml/d	Gravels	Potable Water
3	Thames Water	SU 918 789 (grouped)	0.9 km	27.3 Ml/d	Gravels	Potable Water
4	Dorney Court	SU 927 791	0.85 km	0.9 Ml/d	Gravels	Spray Irrigation
5	West Town Farm	SU 922 804 SU 932 803	0.5 km 1 km	3.2 Ml/d	Gravels	Spray Irrigation

14.2.10 Aquifer protection zones have been established by the former NRA to control development and other activities in areas where the risk of source pollution is present. The scheme is located within a Zone II aquifer protection zone and therefore the former NRA (Thames Region), as the regulatory authority, has been consulted with regard to the proposals and mitigation measures. The vulnerability of the aquifer to pollution due to construction of the temporary motorway diversion is not expected to increase significantly above that resulting from the M4 motorway at present.

Drainage

14.2.11 Currently, runoff from the motorway drains over the edge of the embankment alongside the carriageway into a toe-ditch. The ditches then discharge into either Cress Brook or Roundmoor Ditch. Site investigations have revealed that much of the road runoff infiltrates into the ground. Only during high intensity rain storms is surface water run-off likely to reach the identified watercourses directly.

14.3 Construction Effects and Mitigation

Construction

14.3.1 The key effects as a result of the construction of the temporary motorway diversion would be the potential for sediment runoff during periods of rainfall into nearby watercourses, caused by the exposure of areas of bare earth in preparation for the construction of the diversion.

14.3.2 During the construction phase there would be a large number of vehicles operating on the site, which would require the use of fuels and fluids potentially polluting to the aquatic environment. There is a potential as a result of spillages or leakages for polluting materials to enter the watercourses, or percolate into the aquifer below the site. With the provision of the mitigation described below, the above effects would be of minor significance.

14.3.3 The key consideration during the construction of access routes is the temporary crossing over Cress Brook. Under Sections 109 and 110 of the Water Resources Act 1991 it is necessary to obtain a Land Drainage Consent for the erection of any structure in, over or under any main river. Potential effects on water quality are covered by the Water Resources Act 1991 and additional special conditions agreed between the Environment Agency and the Highways Agency which would be imposed on the Contractor. The access tracks are required for the flood relief channel and any consents and restrictions would therefore be addressed as part of the MWEFAS scheme.

Mitigation

14.3.4 Various mitigation measures would be required of the Contractor by the Water Resources Act 1991 and additional special conditions agreed between the Environment Agency and the Highways Agency which would be included in the Contract.

14.3.5 During construction of the temporary motorway diversion, the effect of sediment runoff would be mitigated by utilising suitable sediment traps and drainage along the edge of the construction area.

14.4 Operational Effects and Mitigation

Operation

14.4.1 There is potential for pollutants from highways to be mobilised during rainfall and to enter watercourses through runoff due to rainfall or from accidental spillages. These sources of pollution have the potential to result in a pollution peak at the onset of a storm event. All highway drainage from the temporary motorway diversion would be discharged into either Roundmoor Ditch or Cress Brook.

14.4.2 The potential for pollution of watercourses due to the presence of roadworks for the underbridge construction would be as described for the construction of the temporary motorway diversion.

14.4.3 The percentage of the catchment covered by impermeable surfaces would increase as a result of the diversion, causing runoff to watercourses in the area to be accelerated for the duration of the temporary works. The result would be that the responsiveness of the catchment to rainfall events would increase (i.e. more rainwater would reach streams more quickly) and the magnitude and frequency of high flows may also increase. These increased discharge rates would result in a corresponding increase in potential risk of local flooding.

14.4.4 The Regulatory Authority consider that for the short period that the temporary motorway diversion would be in place in this catchment area the resulting discharges would be acceptable if the total flow from the motorway during a 1 in 10 year storm is less than 10% of bankfull discharge in each of the receiving watercourses. The 1 in 10 year event was calculated using a Modified Rational Method, whilst bankfull flow

was derived from Mannings equation for the Roundmoor Ditch, and estimates of area and velocity and cross-sectional area for the Cress Brook. These are both standard methods of hydrological assessment. Table 14.2 summarises changes in volumes of highway runoff estimated for a 1 in 10 year flood before, during and after the temporary motorway diversion.

Table 14.2: Values of Highway Drainage

	Existing		With Diversion		Final	
	Cress Brook	Roundmoor Ditch	Cress Brook	Roundmoor Ditch	Cress Brook	Roundmoor Ditch
Highway Runoff (l/s)	414	347	427	567	256	437
Percentage of Bankfull Capacity	7.9	5.5	8.1	9.0	4.9	6.9

Bankfull capacity:
Cress Brook = 5.25 m^3s^{-1} (5250 l/s)
Roundmoor Ditch = 6.3 m^3s^{-1} (6300 l/s)

14.4.5 The above data demonstrates that whilst the temporary motorway diversion is in place, highway runoff from the 1 in 10 year flood remains less than 10% of bankfull capacity discharge for both watercourses, and the effects of increased runoff on receiving watercourses would be of minor significance for the short duration that the temporary motorway diversion would be in place.

Mitigation

14.4.6 A drainage system using channels, pipes and ditches would be used to discharge runoff from the temporary motorway diversion during operation. The former NRA has advised that a spillage containment facility and oil interceptors would not be required within the temporary highway drainage system other than those installed for construction purposes.

14.5 Decommissioning and Restoration

14.5.1 During the decommissioning of the temporary motorway diversion there is the potential for similar effects upon watercourses as described in Section 14.3.

14.5.2 When the flood relief channel has been excavated no highway runoff would be permitted to discharge into it. During restoration of the site the existing motorway drainage layout would be changed to suit that restriction.

14.5.3 Data in Table 14.2 illustrates that under flow conditions such as the 1 in 10 year flood, the volume of water discharged to Cress Brook from highway drainage actually decreases in relation to the present situation. This is due to the route of the flood relief channel decreasing the area of the catchment to the east of Cress Brook. However, any consequent improvement in water quality can be considered a positive benefit.

14.5.4 The catchment area discharging into the Roundmoor Ditch would increase by an amount equivalent to the decrease to Cress Brook. This would cause a minor increase to the flood risk of the Roundmoor Ditch. Table 14.2 illustrates the increase for a 1 in 10 year storm. The former NRA has advised that this increase is acceptable.

14.6 Summary of Effects

14.6.1 The effects of the temporary motorway diversion upon the water quality and drainage of the site are likely to be of minor significance as suitable mitigation would be provided.

14.6.2 After restoration of the site the total run-off from the highway would return to existing values. Due to the location at which the flood relief channel intersects the current discharge routes and as it would not be permitted to accept highway runoff, more highway runoff would need to be directed to Roundmoor Ditch than at present, but less would be discharged into Cress Brook.

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15.0 GEOLOGY AND SOILS

The scheme would be unlikely to have a significant effect on geology and soils due to the limited nature of the works. The main effects would be the slight effect on soil quality due to land take and contamination from road spray. The effect would be short term and there would be no residual effects.

15.1 Assessment Method

15.1.1 The objective was to undertake an assessment to determine the significance of the effects arising from the scheme on geology and soils within the study area.

15.1.2 The basic methodology adopted for the assessment was based on recommendations in Part 11 of Section 3 of the DMRB[1] and involved:

- A desk study to check and update existing data from the M4 and MWEFAS schemes.
- A review of the following published maps:

  - British Geological Survey, Geological Sheet 269 Scale 1:50,000[23]
  - Soil map of England and Wales, 1993 Scale 1:250,000[21]
  - Agricultural Land Classification Map[24]

- Consultations with Ministry of Agriculture, Fisheries and Food, English Nature and Department of Environment.

15.1.3 The significance of the likely effects of the scheme on geology and soils was determined using the following criteria:

- None: no effect on geology or soils.
- Slight: burial of important deposits or strata, loss of local geological interest.
- Minor: reduction in soil quality, minor loss of Grade 3b or 4 agricultural land or very small loss of Grade 1, 2, or 3a land.
- Moderate: partial destruction of a designated geological or geomorphological feature, minor ground movements or changes to the hydrogeological regime which would cause minor change to rock strata or function.

  Total loss and destruction of Grade 3b or 4 agricultural soils or minor loss of Grade 1, 2, or 3a land, loss of valuable seed banks, loss of palaeoenvironmental remains or reduction in soil quality due to large volumes of contaminated road spray.

Effect to contaminated areas that may pose constraints.

- Severe: the total loss and destruction of a designated geological or geomorphological feature, the collapse of underground caves/mines or other major ground movements, changes to the hydrological regime which would damage rock strata or function.

  Total loss and destruction of Grade 1, 2 or 3a agricultural soils.

  Effect to contaminated areas that would result in threat to human health, pollution of sensitive water bodies/groundwater or contamination of sensitive areas e.g. SSSI.

15.2 Existing Conditions

Geology

15.2.1 The geology of the study area comprises the Reading Beds overlain by Flood Plain Gravels which in turn are overlain by alluvium in some locations as illustrated on *Figure 15.1*.

15.2.2 The alluvium is recent material deposited by rivers and streams. It is typically consolidated with a large proportion of clay and a small proportion of silt and sand. Alluvium is approximately 0.6m thick, compressible and has variable geotechnical properties.

15.2.3 In the immediate vicinity of the site alluvium is likely to be found overlying the Flood Plain Gravels in a narrow band stretching north from Lots Hole Culvert, as may be seen in *Figure 15.1*.

15.2.4 Flood Plain Gravel is predominantly a dense to very dense silty, sandy, flint gravel of Pleistocene age, with occasional layers of stiff sandy clay.

15.2.5 Flood Plain Gravel can be found throughout the site. It can be found to a depth of 8.5m - 9.8m adjacent to the existing motorway but only to 3.8m depth below ground level 100m north of the motorway.

15.2.6 The upper weathered zone contains a proportion of clay and less gravel than the unweathered material. This zone can be found between 0.4m and 0.8m depth. This zone also contains the topsoil which is not clearly distinguished in the borehole logs.

15.2.7 Reading Beds, which are present beneath the Flood Plain Gravels, consist of an extremely variable series of over consolidated estuarine clays and sands. They are generally thinly bedded and comprise mottled multicoloured fissured silty and sandy clays with occasional gravel, clayey silts, commonly calcareous.

Soils

15.2.8 The soil map shows that the soils of the site belong to Sutton 2 Soil Association. These are well drained fine and coarse loamy soils usually over gravel with a calcareous matrix.

15.2.9 The agricultural land in the study area is classified as Grade 2 which is described as very good quality, with minor limitations to agricultural use.

15.2.10 During the archaeological survey for MWEFAS a narrow peat filled channel was revealed near the local depression along the notional line of Cress Brook to the north of the motorway. (Refer to Appendix 6.1).

Site Designation

15.2.11 There are no designated geological Sites of Special Scientific Interest (SSSI) or Regionally Important Geological Sites (RIGS), within or close to the study area boundary.

Palaeoenvironmental Remains

15.2.12 Previous assessment undertaken for the M4 and MWEFAS schemes identified Lot's Hole, a site of known archaeological interest north and south of the M4, as a site with potential organic artefacts (see Chapter 6).

15.3 Construction Effects and Mitigation

Construction

15.3.1 Top soil would be stripped and stockpiled.

15.3.2 The effects of construction of the temporary embankment would be to consolidate the soils immediately below the formation level of the embankment. The effect on soils would therefore be slight.

15.3.3 There would be a loss of 1.25 ha of Grade 2 agricultural land during construction which would temporarily constitute a slight effect.

15.3.4 The route of the flood channel would result in the loss of all potential palaeoenvironmental features. A full archaeological excavation of the site would be carried out in advance of the underbridge and temporary motorway diversion contract being let. Any finds would be fully documented and recorded, prior to the construction of the underbridge and temporary motorway diversion. The diversion would affect part of the Lot's Hole site which is outside the area planned for excavation as part of the MWEFAS scheme.

Mitigation

15.3.5 To retain top soil quality, stockpiles would not exceed 2 m in height. Careful stripping of soil and stockpiling should minimise effects on soil structure and quality.

15.3.6 Loss of agricultural land would be kept to a minimum by fencing of construction areas.

15.3.7 The MWEFAS archaeologist would also act as project archaeologist for the bridge and motorway diversion scheme and would observe top soil stripping during the construction of the temporary motorway diversion for the area which falls outside that subject to the programmed archaeological investigation for MWEFAS. Any finds would therefore be documented and recorded. It is likely that the peat filled channel identified in exploratory archaeological surveys would be excavated across the width of the motorway diversion during this exercise. The other overburden above the gravel in the area of interest would also be excavated in advance of any construction activity.

15.4 Operational Effects and Mitigation

Operation

15.4.1 The operational effects are the same as those for construction. However, there could be an effect on soil quality during operation caused by road spray contamination, particularly where there are no soil/vegetation barriers to prevent spray dispersal. The closer proximity of the M4 would potentially affect the soil within the study area. However, it is considered that levels of contamination would be low and due to the temporary nature of the project any effect would be slight.

Mitigation

15.4.2 The provision of an environmental barrier on the temporary embankment adjacent to the motorway would prevent spray dispersal in this location.

15.5 Decommissioning and Restoration

15.5.1 The embankment would be removed completely.

15.5.2 The topsoil would be excavated from the stockpiles and laid to restore existing ground levels on areas which would not be affected by the flood relief channel. These operations would not be undertaken using a tracked vehicle or during periods of heavy rain.

15.6 Summary of Effects

15.6.1 Careful stripping of soil and stockpiling would minimise effects on soil structure and quality.

15.6.2 It is anticipated that the temporary motorway diversion would have no significant effects on the geology, geomorphology and soils of the study area. No designated sites would be affected.

15.6.3 It is anticipated that there would be a slight effect to soil quality in the study area due to land take and contamination from roadspray. This effect would only be short term and following restoration, no long term effects are expected.

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16.0 POLICIES AND PLANS

The scheme would be unlikely to have a significant effect on policies and plans due to the limited nature of the works. The main effects would be on policies in relation to archaeology, landscape, agriculture and water courses. Effects would be mitigated by maintenance of a watching brief, provision of a visual barrier and replacement planting, minimal land take and restoration of land to its previous state.

16.1 Assessment Method

16.1.1 The objective was to undertake an assessment to determine the significance of the effects arising from the proposed scheme on the achievement of national, regional, county and local planning policy objectives.

16.1.2 All relevant planning policies which cover the study area and which have a bearing on the scheme were reviewed in order to ascertain the significance of the effects on the achievement of the policy objectives. They include those produced at the national level, regional level, and county and local level. Information was also obtained on significant planning applications within the study area.

16.1.3 The basic methodology adopted for the assessment was based on the recommendations in Part 12 of Section 3 of the DMRB[1] and involved:

- A review of all relevant national and regional policies.
- A review of all relevant structure and local plans.
- Compilation of a schedule of policies.
- A review of planning applications in the study area.
- An assessment of the significance of the likely effects of the proposed scheme on planning policy objectives.
- An assessment of the effect on planning applications.
- The development of appropriate mitigation measures.

16.1.4 The significance of the likely effects of the scheme can be determined by the degree to which the achievement of policy objectives are hindered or facilitated. The following criteria were used to assess the significance:

- None: no effect on planning policies and designations.
- Slight: a minor conflict with local planning policies.

- Moderate: conflict with local and county policies
- Severe: directly contravenes regional and national policies and designations.

16.2 Existing Conditions

Planning Policy Background

16.2.1 National planning policy and guidance which is produced by the government generally comes in the form of Circulars, Planning Policy Guidance notes (PPGs) and Mineral Policy Guidance notes (MPGs).

16.2.2 Planning policy at the regional level is provided by Regional Planning Guidance notes (RPGs) which set out a broad development framework for the region on transport strategy, the environment, housing and infrastructure.

16.2.3 Structure plans set out the planning policies at the countywide level, taking into account the planning guidance given at the national and regional level; and provide the overall pattern for new development and cover strategic issues. More detailed planning policies are given in the local plans, which are produced by the district or borough councils, including those concerning the environment, transportation, housing, leisure and community facilities and industrial and commercial development. The minerals local plan, prepared by the county, provides guidance and policies on the supply of aggregates, the protection of mineral deposits and on good practice for restoration, afteruse and aftercare of minerals sites.

Study Area

16.2.4 *Figure 16.1* illustrates the planning designations and policies which apply to the study area. The study area falls entirely within the district of South Bucks in the county of Buckinghamshire. Buckinghamshire itself is considered part of the South East Region for which strategic planning guidance has been produced in the form of Regional Planning Guidance Note 9: Regional Planning Guidance for the South East (RPG 9)[25]. RPG 9 provides a development framework for the entire region.

16.2.5 Buckinghamshire County Council are currently in the process of producing a new County Structure Plan. It has been placed on deposit[26] and modifications[27] to the deposit version have recently been published by the County Council. Although the new plan incorporates the most up to date planning guidance, the adopted Structure Plan (incorporating amendments 1, 2, 3 and 4)[28] is still in force, however more weight is being given to the policies in the emerging plan as it nears formal adoption.

16.2.6 South Bucks District Council are also in the process of producing a new development plan. The draft local plan for Public Consultation[29] was published in April 1995 and is at the first stage in the plan adoption process. The Local Plan for South Bucks[18] currently in force was adopted in 1989.

16.2.7 Environmental Impacts Table A - Appraisal Group 4 (Appendix 1.2) sets out the policies relevant to the assessment. The study area is within the designated green belt, forming part of the Metropolitan Green Belt surrounding London. Objectives behind the green belt designation include checking the unrestricted sprawl of urban areas, safeguarding the countryside from encroachment and protecting its open character. Planning Policy Guidance Note 2 (PPG2)[30] sets out the Government's policy on green belt which contains a general presumption against inappropriate development and also states that the boundary should only be altered in exceptional circumstances. Government policy is incorporated by the RPG, structure plan and local plan.

16.2.8 To the north of the housing at Glebe Close land has been designated as a Local Landscape Area in the Local Plan. Such designation carries with it a general presumption against development which would have an adverse effect on the landscape and amenity of the area.

16.2.9 Archaeological investigations have revealed a site known as Lot's Hole which extends both north and south of the existing motorway This site, which is recorded on the Buckinghamshire County Sites and Monuments Record (SMR), PRN 2114, dates from the early to mid Bronze age and was damaged during the construction of the Slough Bypass. Policies from the national level down generally presume against the loss or destruction of sites of archaeological importance.

16.2.10 The agricultural land within the study area is of high quality and is versatile, being classified, under the Agricultural Land Classification (ALC), as Grade 2. Such land is considered a national resource, with policies to prevent the permanent loss of high quality land (land classified as ALC grades 1, 2 and 3a), given in RPG 9, the structure plan and local plan.

16.3 Construction Effects and Mitigation

Construction

16.3.1 The temporary motorway diversion would encroach further into the green belt where there is a restriction on many forms of development. However, the diversion is considered as essential infrastructure development, which is permitted on green belt land, and is temporary. Thus there would be no effect on policies designed to protect the green belt.

16.3.2 There is a general presumption, as specified in the planning policies outlined in the Environmental Impacts Tables, against the destruction of archaeological sites, however the planning authorities can apply conditions which require excavation and recording. Lot's Hole would be excavated prior to any earthworks associated with the flood channel and a watching brief would be maintained during removal of top soil from the area affected by the temporary motorway diversion outside that required for the MWEFAS scheme. There would therefore be no overall conflict with planning policies.

16.3.3 During construction, existing vegetation alongside the motorway would be removed, opening up views of the motorway. Policy L3, South Bucks Local Plan, presumes against development within or adjacent to the Local Landscape Area (LLA) which would have an adverse effect on the amenity of the site. The LLA lies just to the north west of the temporary motorway diversion (as shown on *Figure 16.1*) and views of the diversion would be possible from within this area. There would therefore be a slight effect on the policy.

16.3.4 Policies from the national level down aim to preserve the best and most versatile agricultural land from development, however the effect on the policies would only be slight as the diversion is a temporary structure, and only a small area of land would actually be affected.

16.3.5 PPG 13 Transport[31] contains guidance on the use of waste/recycled materials for road construction. This policy would be assisted as it is anticipated that embankment fill material would be taken from the line of the channel and would be made available for reuse by MWEFAS on removal of the temporary motorway diversion.

Mitigation

16 3.6 Fencing would be erected to prevent high quality agricultural land from being directly disturbed during construction and conflicting with the policies protecting such land. Vegetation would be retained where possible to minimise the effects on the views from the LLA and hence Policy L3.

16.3.7 An archaeological watching brief would be maintained during top soil removal for the area affected by the temporary motorway diversion outside that investigated for the MWEFAS scheme.

16.4 Operational Effects and Mitigation

Operation

16.4.1 During operation views of the motorway would be opened up from within the LLA due to the loss of vegetation. The effect on Policy L3 would be slight.

16.4.2 The temporary motorway diversion is located in an area, identified in the South Bucks Local Plan, as being at risk from flooding. Buckinghamshire County Council and South Bucks District have a general presumption against permitting development in such an area. Whilst the temporary motorway diversion is in place, discharge to the Cress Brook and Roundmoor Ditch and the effects of increased runoff on receiving watercourses would be of minor significance.

Mitigation

16.4.3 An environmental barrier would be provided opposite Glebe Close to mitigate views from this area of the LLA.

16.5 Decommissioning and Restoration

16.5.1 It is proposed to restore the land back to its former use once the temporary motorway diversion has been decommissioned, therefore there would be no permanent loss of high quality agricultural land and no effect on planning policies.

16.5.2 Planting would, in time, mitigate views opened up of the motorway from within the LLA and the environmental barrier would be moved to the edge of the M4 to mitigate views while planting establishes.

16.5.3 The total run-off from the highway would return to existing levels with decreased discharge to Cress Brook and increased discharge to Roundmoor Ditch.

16.6 Summary of Effects

16.6.1 Although the temporary motorway diversion would be located within an area of Green Belt, such developments are considered to be essential infrastructure and are therefore permitted. Therefore there would be no effect on planning policy.

16.6.2 Due to the planned archaeological excavation of Lot's Hole for the MWEFAS scheme, and the maintenance of a watching brief, the temporary motorway diversion would not result in conflict with relevant policies.

16.6.3 The removal of vegetation adjacent to the motorway would open up views from the nearby Local Landscape Area and would therefore have a slight effect on planning policy. Vegetation would be retained where possible to minimise this effect and an environmental barrier would be provided. In the longer term, proposed planting would mitigate views opened up of the motorway.

16.6.4 Due to the temporary nature of the scheme, the effect on agricultural land would be slight. Mitigation would minimise land take during construction and land would be restored to its previous state.

16.6.5 As it is anticipated that embankment fill material would be taken from the line of the channel and would be made available for reuse by MWEFAS on removal of the temporary motorway diversion, national policy guidance which contains advice on the use of waste/recycled materials would be complied with.

16.6.6 The effects upon the water quality and drainage are likely to be of minor significance.

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17.0 SUMMARY OF ENVIRONMENTAL EFFECTS

17.1 Introduction

17.1.1 This chapter summarises the key environmental issues associated with the temporary motorway diversion, taking into account mitigation proposals and the significance of both beneficial and adverse effects.

17.2 Air Quality

17.2.1 The temporary motorway diversion would result in very minor changes to air quality. Calculations for the existing situation and the diversion show a slight benefit to local air quality even though levels of NO_2 would remain close to air quality standard limit levels at Elm House. The effect on regional air quality would not be significant.

17.2.2 During construction, decommissioning and restoration the potential would exist for dust (PM) generation, but with measures to control dust, effects on air quality would be mitigated.

17.2.3 The overall effect on air quality is considered to be of minor significance.

17.3 Cultural Heritage

17.3.1 The temporary motorway diversion would not affect any Listed Buildings, Conservation Areas or designated sites.

17.3.2 As part of the MWEFAS scheme, part of Lot's Hole archaeological site would be subject to archaeological investigation prior to the construction of the temporary motorway diversion and the scheme would therefore have no effect on this part of the site. The area affected by the temporary motorway diversion outside that required for the MWEFAS scheme, and the area affected by excavation of the bridge foundations would be subject to an archaeological watching brief during construction. The effect is therefore considered to be slight.

17.4 Disruption due to Construction

17.4.1 Most highway engineering projects result in some noise disturbance and the temporary motorway diversion and bridge works are no different in this respect. However, the results of the calculations indicate that construction noise levels would be below 75 $dBL_{Aeq(12hr)}$ in residential areas. Measures have been incorporated into the scheme which would aid noise control as recommended in BS 5228.

17.4.2 Vibration levels due to construction are expected to be very low and appropriate control limits have been recommended.

17.5 Ecology and Nature Conservation

17.5.1 The temporary motorway diversion would not affect any SSSI's or sites of regional conservation value.

17.5.2 The temporary motorway diversion would result in the loss of part of an area of Wych Elm which lies along the existing motorway. This area has been identified as a habitat of major local nature conservation value as it supports a species protected from sale by statute. The effect on this habitat would be moderate. Replacement planting would be a key mitigation measure.

17.5.3 The effect of the temporary motorway diversion on the rough grassland habitat of the Western Field is of slight local significance due to the loss of part of this species rich invertebrate habitat. Appropriate reinstatement of the site would be carried out. Measures to mitigate potential effects on a second species protected by statute would be incorporated into the scheme.

17.6 Landscape Effects

17.6.1 The temporary motorway diversion would have a slight adverse effect on the landscape character and quality of the study area throughout construction and operation, due to the existing influence of the M4 and the ability of the landscape to accept change. Properties in Glebe Close would also experience adverse effects due to their close proximity to the proposed temporary motorway diversion. The provision of a visual barrier would mitigate the immediate views of the diversion during construction and operation, and in the reinstatement period. Other properties within the study area presently experience a slight adverse effect from the existing motorway, but would experience a further slight increase in adverse visual impact during construction and operation. The visual impact of the proposed temporary motorway diversion would be greatest during the construction period, resulting from the loss of screen vegetation and increased activity.

17.6.2 Following restoration and the establishment of planting, including the planting associated with the MWEFAS scheme, the overall visual impacts would be of slight beneficial impact or a situation of no change. The combined effects of the mitigation works and MWEFAS scheme fifteen years after reinstatement works would enhance the landscape character of the area.

17.7 Land Use

17.7.1 There are no properties which would experience loss of land within their curtilage, and only a small amount of agricultural land would be temporarily lost during the construction and operation phase, as it would be restored back to its former use after completion of the scheme. The construction, operation and decommissioning of the temporary motorway diversion would have only a minor effect on land use in the study area.

17.8 Traffic Noise and Vibration

17.8.1 The nearest residential properties to the proposed temporary motorway diversion would experience very slight decreases in traffic noise levels of up to 0.9 dB(A). The DMRB treats changes in traffic noise levels between the range <-1 to <+1 dB(A) as denoting no significant change. Thus changes in traffic noise levels would not be discernible to the human ear and would be insignificant in terms of noise effect. Changes in vibration levels at nearby properties due to traffic on the temporary motorway diversion would not be of significance. After the decommissioning of the temporary motorway diversion, traffic noise levels would be the same as if the scheme had not been undertaken.

17.9 Pedestrians, Cyclists, Equestrians and Community Effects

17.9.1 Access would be maintained along Footpaths 18 and 23 throughout the scheme and gates or stiles would be provided if fences are crossed. Due to the construction activity there would be some reduction in the visual and aural amenity of footpaths. Due to the temporary nature of the scheme this is not considered significant. There would be no effect on community facilities.

17.10 Vehicle Travellers

17.10.1 With the exception of the eastern end of the scheme, where the visual barrier would prevent views, the removal of part of the existing vegetation located along the northern embankment would result in open views north of the existing M4 across the suburban-rural landscape until proposed tree and shrub planting has established. Following maturity of this planting and that associated with the MWEFAS scheme, the views would be similar to those experienced at present.

17.10.2 Driver stress would remain high during construction. Appropriate use of lighting, signs and road markings would keep driver stress close to existing levels and would maintain operational safety.

17.11 Water Quality and Drainage

17.11.1 The effects of the temporary motorway diversion upon the water quality and drainage of the site are likely to be of minor significance as suitable mitigation would be provided.

17.11.2 After restoration of the site the total run-off from the highway would return to existing values. Due to the location at which the flood relief channel intersects the current discharge routes, and as it would not be permitted to accept highway run-off, more highway runoff would need to be directed to Roundmoor Ditch than at present, but less would be discharged into Cress Brook.

17.12 Geology and Soils

17.12.1 Careful stripping of soil and stockpiling would minimise effects on soil structure and quality. It is anticipated that the temporary motorway diversion would have no significant effects on the geology, geomorphology and soils of the study area. No designated sites would be affected. It is anticipated that there would be a slight effect to soil quality in the study area due to land take and contamination from roadspray. This effect would only be short term and following restoration, no long term effects are expected.

17.13 Policies and Plans

17.13.1 Although the temporary motorway diversion would be located within an area of Green Belt, such developments are considered to be essential infrastructure and are therefore permitted. Therefore there would be no effect on planning policy.

17.13.2 Due to the planned archaeological excavation of Lot's Hole for the MWEFAS scheme, and the maintenance of a watching brief, the temporary motorway diversion would not result in conflict with relevant policies.

17.13.3 The removal of vegetation adjacent to the motorway would open up views from the nearby Local Landscape Area and would therefore have a slight effect on planning policy. Vegetation would be retained where possible and a visual barrier provided to minimise this effect. In the longer term planting would mitigate views opened up of the motorway.

17.13.4 Due to the temporary nature of the scheme, the effect on agricultural land would be slight. Mitigation would minimise land take during construction and land would be restored to its previous state.

17.13.5 As it is anticipated that embankment fill material would be taken from the line of the channel, and would be made available for reuse by MWEFAS on removal of the temporary motorway diversion, national policy guidance which contains advice on the use of waste/recycled materials would be complied with.

17.13.6 Whilst the diversion is in place the effects on water quality and drainage are likely to be of minor significance.

17.14 Conclusions

17.14.1 In conclusion many of the effects identified would be temporary in nature and with the mitigation proposed these effects would not be significant. Effects of greater significance include the loss of vegetation which supports a species protected from sale by statute. Mitigation to recreate this habitat is proposed. Due to the proximity of the temporary motorway diversion to residential properties at Glebe Close the visual impact has been identified as of greater significance at this location during construction, operation and decommissioning. Again, appropriate mitigation is proposed.

REFERENCES

1. Design Manual for Roads and Bridges, Volume 11, Department of Transport, 1994

2. Maidenhead, Windsor and Eton Flood Alleviation Scheme Environmental Statement, National Rivers Authority, January 1991.

   Maidenhead, Windsor and Eton Flood Alleviation Scheme Planning Application and Supporting Documents, National Rivers Authority, January 1991.

3. Maidenhead, Windsor and Eton Flood Alleviation Scheme Public Inquiry Documents, National Rivers Authority, September 1992.

4. Digest of Environmental Protection and Water Statistics, No. 16, Department of the Environment, HMSO London, 1994

5. MWEFAS Archaeological Evaluation, Stage 3, Steve Ford, 1991

6. M4 Motorway M25 to Junction 8(9) Assessment Report for Public Consultation: Part of Volume 2 - Archaeology, October 1993

7. Control of Pollution Act 1974, HMSO.

8. British Standard 5228 'Noise control on construction and open sites', (Parts 1 & 4), BSI, 1984.

9. Calculation of Road Traffic Noise (CRTN). Department of Transport Welsh Office, 1988.

10. British Standard 6472 'Guide to evaluation of human exposure to vibration in buildings (1Hz to 80Hz)', BSI, 1992.

11. Handbook for Phase 1 Habitat Survey, A Technique for Environmental Audit. Nature Conservancy Council (1990).

12. Wildlife and Countryside Act, 1981.

13. Atlas of Butterflies in Britain and Ireland. J. Heath, E. Pollard and J. A. Thomas. Viking (1984).

14. Grasshoppers and Allied Insects of Great Britain and Ireland. Judith A. Marshall and E.C.M. Haes. Harley Books (1990).

15. British Wildlife Magazine, Volume 4, Number 2 (December 1992), Volume 5, Number 4 (April 1994)

16. Landscape Assessment : A Countryside Commission Approach (Countryside Commission 1987)

17. The Good Roads Guide, Department of Transport, 1992

18. Local Plan for South Bucks, South Bucks District Council, 1989

19. Chapter 8 of the Traffic Signs Manual, Traffic Safety Measures and Signs for Road Works and Temporary Situations, Department of Transport, 1991

20. Policy and Practice for the Protection of Groundwater, NRA, 1992

21. Soil Map of England and Wales, Sheet 6 (1:250 000). Soil Survey of England and Wales, 1983

22. Water Resources Act, 1991

23. Geological Sheet 269 Scale 1:50000

24. Agricultural Land Classification Map, Ministry of Agriculture, Fisheries and Food

25. Regional Planning Guidance Note 9 (RPG9): Regional Planning Guidance for the South East, Department of the Environment, May 1994

26. The New Buckinghamshire County Structure Plan: Deposit Draft, Buckinghamshire County Council, April 1994

27. Buckinghamshire County Structure Plan 1991-2011 (Deposit Draft) Proposed Modifications, Buckinghamshire County Council, June 1995

28. Approved Buckinghamshire County Structure Plan (incorporating alterations 1, 2, 3 and 4), Buckinghamshire County Council, November 1990

29. South Bucks District Local Plan: Draft for Public Consultation, South Bucks District Council, April 1995

30. Planning Policy Guidance Note 2 (PPG2): Green Belts, Department of the Environment, January 1995

31. Planning Policy Guidance Note 13 (PPG13): Transport, Department of the Environment, March 1994

APPENDIX 1.1

SUMMARY OF CONSULTATIONS

Summary of Consultations

Organisation	Contact Name	Comments/Issues of Concern
English Nature (Thames and Chilterns)	Jonathan Spencer Conservation Officer	Unaware of any environmental implications for this part of the scheme not already covered by assessment for the flood alleviation channel. Suggested discuss bridge proposals further following ecological survey and formulation of recommendations on working practice and mitigation measures.
Buckinghamshire County Council	David Periam Senior Planning Officer	Scoping Report comprehensive. Much of the work required has already been carried out as part of the Environmental Statement for the MWEFAS scheme. Identified key constraints in the study area including areas of archaeological interest, Area of Attractive Landscape, Rights of Way, Conservation Area, Local Landscape Area and Biological Notification Site (see below). No identified preferred areas for mineral extraction within or adjoining study area.
Bucks County Council Library and Museum Service	Neil Davidson Environmental Records Officer	Advised that Biological Notification Site (97E07) has recently been reviewed in the light of the latest Biological Notification Site criteria and failed to meet the standards. The site is no longer registered as a Biological Notification Site.
South Bucks District Council	P R Geehan Director of Planning Services	Provided comments on Scoping Report, information on Tree Preservation Orders and recreational sites.
Berkshire, Buckinghamshire and Oxfordshire Naturalist Trust (BBONT)	Linda Carter Conservation Projects Officer	No data available on Recorder Biological Database.
Berkshire, Buckinghamshire and Oxfordshire Naturalist Trust (BBONT)	Tim Sykes	No survey work has been carried out on status of otters in the study area. Provided information on otters within catchment and recommendations for assessment.
Otters and Rivers Project	See Above	Reply received from BBONT (Confidential Species Report).
Buckinghamshire Badger Group	Margaret Robertson Secretary	Information provided (Confidential Species Report).

Summary of Consultations (Cont)

Organisation	Contact Name	Comments/Issues of Concern
Hawk and Owl Trust	Dr Shawyer	Provided data (Confidential Species Report).
Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit	Ben Linscott Assistant Regional Planning Advisor	Provided information on land use, agricultural land classification and restoration. Advised the site lies within an area mapped as being of very good quality agricultural land, where there is a national planning presumption in favour of its protection from irreversible development (Planning Policy Guidance Note 7, paras 2.5 and 2.6). Advised that the actual land quality is important since it may influence the measures (and standard) which would be required in order to restore the land back to agricultural use. *Land Use* Advised the predominant land use within the study area is field scale vegetables which are grown in rotation with cereals. Vegetables and fruit crops are grown around West Town Farm. Around the village of Dorney Reach there are several areas of paddocks and other urban fringe land use e.g. playing fields and rough ground etc. The land is flat and several of the fields have been enlarged to provide better access for irrigation and large machinery. Much of the vegetable and fruit crops are hand picked. *Agricultural Land Classification* Provided extract from the Agricultural Land Classification Map (sheet 159) which shows most of the land is Grade 2 with a proportion of Grade 1 and is classified as best and most versatile land. Advised that assuming this accurately reflects the land quality, particular attention should be paid to Section 2 of restoration literature "Soil stripping, handling and storage". Restoration should be carried out to such a standard as to return the soil to the same grade as it was when stripped. *Restoration* Provided schedule of specimen conditions typically applied by Minerals Planning Authorities in the restoration of minerals workings. Stated need for rigorous supervision of the soil stripping and storage to ensure that the soil is returned to the site in the same grade that it left.

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APPENDIX 1.2

ENVIRONMENTAL IMPACTS TABLES

TABLE A : APPRAISAL GROUPS

1. Local People and their Communities
2. Travellers
3. The Cultural and Natural Environment
4. Policies and Plans

TABLE B : LAND USE

TABLE C : MITIGATION

Environmental Impacts Table A - Appraisal Groups

GROUP 1: LOCAL PEOPLE AND THEIR COMMUNITIES						
SUB GROUP	EFFECTS	UNITS	EXISTING CONDITIONS	CONSTRUCTION EFFECTS	FINAL CONDITIONS	COMMENTS
Residential	Properties demolished	Number	-	0	0	
	Air Quality	Number of properties subject to concentrations exceeding air quality standards	0	0	0	
	Noise dBL_{A10}, 18hr	Number of properties experiencing an increase of more than 1 dBL_{A10} Number of properties experiencing a decrease of more than 1 dBL_{A10}	0 0	0 0	0 0	
	Visual impact (Adverse/ Beneficial)	(a) Winter one year after reinstatement /opening Number of properties subject to : Substantial Moderate Slight No Change	 1 28	 0 1 5 23		Beneficial effects shown in brackets. Majority of slight adverse visual impacts are from first floor windows and gardens only in (a) Existing effects identified in Appendix 9.1.

Environmental Impacts Table A - Appraisal Groups (cont.)

GROUP 1: LOCAL PEOPLE AND THEIR COMMUNITIES						
SUB GROUP	EFFECTS	UNITS	EXISTING CONDITIONS	CONSTRUCTION EFFECTS	FINAL CONDITIONS	COMMENTS
Residential (Cont.)	Visual impact Adverse/ Beneficial (Cont.)	b) Winter: 15 years after reinstatement/ opening No. of properties subject to: Substantial Moderate Slight No Change	As above		 0 0 (3) 26	Beneficial effects shown in brackets
		c) Summer: 15 years after reinstatement/ opening No. of properties subject to: Substantial Moderate Slight No Change			 0 0 (3) 26	Beneficial effects shown in brackets . Improvements as planting matures.
	Severance	(a) Relief to existing severance	None	None	None	
		(b) Imposition of new severance	None	None	None	

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 2: TRAVELLERS						
SUB GROUP	EFFECTS	UNITS	EXISTING CONDITIONS	CONSTRUCTION EFFECTS	FINAL CONDITIONS	COMMENTS
Residential (cont.)	Disruption	No. of houses	-	3 houses within 100 metres	-	Properties at Glebe Close may experience localised short term effects during construction
Travellers Amenity Vehicle Users' Amenity	Driver Stress	Level of stress	High stress	High stress	High stress	
	Views from the Road	-	Restricted views. No views to north and intermittent views to south	Views to north restricted by environmental barrier for half the length of diversion. Unrestricted views for remaining half	Views to the north from cars restricted behind visual barrier. Open views until plant establishment 15 years after reinstatement	
Pedestrians' Amenity	Severance (New)	Number of rights of way affected	-	No change	No change	Access maintained at all times and gates/stiles provided
	Change in Amenity	Number of rights of way affected	-	Slight reduction in amenity for 3 footpaths	No change	During construction amenity affected.
Travellers Safety Vehicle Users	Accident severity	-	Personal injury accident rate lower than national average	Temporary reduction in the severity of accidents due to lower speeds. Possible increase in incidents due to temporary layout	No change	Effective advanced temporary signing and traffic management would minimise any effect on the accident rate

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 3: THE CULTURAL AND NATURAL ENVIRONMENT						
SUB GROUP	EFFECTS	UNITS	EXISTING CONDITIONS	CONSTRUCTION EFFECTS	FINAL CONDITIONS	COMMENTS
Heritage a) Scheduled Sites	Landtake	No.	0	0	0	
b) Listed Buildings	Landtake Visual impacts	No.	0 None	0 No change	0 No change	
c) Unscheduled Sites	Landtake	No.	No change	1	See comment	Site affected by flood relief channel
Nature Conservation M4 Elm Copse (Habitat G on *Figure 8.1*)	Habitat loss	-	No change	Partial loss of vegetation -moderate local effect	Partial loss of habitat-moderate local effect Replacement planting proposed	Moderate effect on habitat of a species protected from sale under Wildlife and Countryside Act (1981).
Western field (Habitat F *Figure 8.1*)	Habitat loss		No change	Partial loss of species rich invertebrate habitat-slight local effect	Partial loss of habitat-slight local effect	Mitigation includes natural regeneration to recreate interest
Cress Brook (Habitat E *Figure 8.1*)	Habitat loss		No change	Slight local effect due to loss of section of bankside habitat to temporary crossing	No change	Site would be affected by the flood relief channel construction access
Protected Species			No change	Partial loss of habitat for one species.	Partial loss of habitat.	Mitigation measures would reduce effect
			No change	Potential effect for second statutory protected species slight	No change	Mitigation measures would reduce effect

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 3: THE CULTURAL AND NATURAL ENVIRONMENT						
SUB GROUP	EFFECTS	UNITS	EXISTING CONDITIONS	CONSTRUCTION EFFECTS	FINAL CONDITIONS	COMMENTS
Water Quality and Drainage	Effect on water quality and rate of discharge	-	Potential accidental pollution of watercourses from traffic on M4. Over the edge drainage into toe ditches	Potential accidental pollution of watercourses from traffic on M4. Potential pollution of watercourses. Use of sediment traps and drainage along construction area would mitigate effects Temporary drainage system would discharge runoff	Potential accidental pollution of watercourses from traffic on M4. Total run off would return to existing values-more runoff discharged to Roundmoor Ditch, less to Cress Brook due to flood channel. Drainage system changed to ensure no carriageway run-off enters the flood relief channel	
Landscape	Effect on designated Local Landscape Area (LLA)		No change	Loss of vegetation along highway boundary would open up views - with slight overall effect to landscape character and quality	Roadside planting and visual barrier would provide mitigation, resulting in no change from the existing situation.	

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 4: POLICIES AND PLANS : ARCHAEOLOGY				
POLICY	AUTHORITY	INTEREST	EFFECT ON POLICY	COMMENTS
1. PPG 16 Archaeology and Planning (Para 13)	National	Preservation of archaeological features by record.	Policy assisted.	Archaeological site would be excavated as part of MWEFAS scheme. Watching brief during removal of top soil for area not required for MWEFAS channel.
2. PPG 16 Archaeology and Planning (Para 25)	National	Excavation in advance of development.	(As above)	
3. Structure Plan Para 74a	Buckinghamshire County Council	Imposition of conditions on developments regarding archaeological remains.	(As above)	
4. Deposit Draft Structure Plan Proposed Modifications Policy HE 1	Buckinghamshire County Council	Presumption against adverse effects on archaeological sites.	No additional effect on policy as site affected by MWEFAS scheme	(As 1. above)
5. Local Plan Policy C4	South Bucks District Council	Protection for archaeological sites.	(As above)	
6. Draft Local Plan Policy C18	South Bucks District Council	Protection for archaeological sites.	(As above)	

GROUP 4: POLICIES AND PLANS : AGRICULTURE				
POLICY	AUTHORITY	INTEREST	EFFECT ON POLICY	COMMENTS
7 PPG 13 Transport Para 5.16	National	Minimise effect on best/most versatile agricultural land.	Policy would be temporarily affected.	Land would be restored back to agricultural use where possible.
8. RPG 9 Regional Planning Guidance for the South East Para .I.10v	Regional	Safeguard best and most versatile agricultural land.	(As above)	
9. Draft Local Plan Policy L7	South Bucks District Council	Presumption against irreversible loss of best agricultural land.	(As above)	

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 4: POLICIES AND PLANS : GREEN BELT				
POLICY	AUTHORITY	INTEREST	EFFECT ON POLICY	COMMENTS
10. PPG2 Green Belts Para 1.5	National	Protection of Green Belt from development.	No effect on policy .	Where diversion encroaches into Green Belt land as infrastructure development.
11. RPG 9 Regional Planning Guidance for the South East Para 1.10v, 4.1	National	Protection of Green Belt.	(As above)	
12. Structure Plan Para 35	Buckinghamshire County Council	General presumption against development in Green Belt except for roads.	No effect .	Essential infrastructure works would be carried out.
13. Deposit Draft Structure Plan Proposed Modifications Policy GB3	Buckinghamshire County Council	Presumption against development in Green Belt.	(As 7 above)	
14. Local Plan Policy GB1	South Bucks District Council	Defines area where Green Belt policies and objectives apply.	(As above)	
15. Draft Local Plan Policy GB1	South Bucks District Council	Safeguards Green Belt from inappropriate development.	(As above)	

GROUP 4: POLICIES AND PLANS : LANDSCAPE				
POLICY	AUTHORITY	INTEREST	EFFECT ON POLICY	COMMENTS
16. Deposit Draft Structure Plan Proposed Modifications Policy LS1	Buckinghamshire County Council	Minimise adverse effects of development in open countryside.	Policy not assisted where screening vegetation lost.	
17. Draft Local Plan Policy L3	South Bucks District Council	Presumption against development within/adjacent to LLA with adverse effect on landscape/ amenity of area.	Minor effect on policy - loss of vegetation from highway boundary opening up views from LLA.	
18. Draft Local Plan Policy L11	South Bucks District Council	Retain existing trees and shrubs where possible.	Policy assisted - vegetation to be retained where possible.	Refer to landscape section

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 4: POLICIES AND PLANS : TRANSPORT INFRASTRUCTURE				
POLICY	AUTHORITY	INTEREST	EFFECT ON POLICY	COMMENTS
19. PPG13 Transport Para 5.15	National	Minimise effect of improvements to infrastructure on environment.	Policy assisted .	Environmental assessment process includes mitigation and minimisation of effects.
20. PPG 13 Transport Para 5.17	National	Minimise effects during construction including transport of materials and spoil.	(As above)	
21. PPG 13 Transport Para 5.21	National	Use of suitable waste and recycled materials for road construction.	Policy assisted .	Anticipated that embankment fill material would be taken from line of channel and made available for reuse by MWEFAS

GROUP 4: POLICIES AND PLANS : POLLUTION (AIR & NOISE)				
POLICY	AUTHORITY	INTEREST	DIVERSION	COMMENTS
22. PPG24 Planning and Noise Para 13	National	Mitigation of noise	Policy not affected. Noise during construction not significant	Mitigation not required
23. Deposit Draft Structure Plan Proposed Modifications Policy TR6	Buckinghamshire County Council	Minimise effect of traffic noise and air pollution from road developments.	(As above)	Temporary effect on residential property- not significant
24. Draft Local Plan Policy EP9	South Bucks District Council	Presumption against development generating noise (particularly from traffic) disturbing noise sensitive uses.	Policy not affected - temporary effect on residential property not significant	

Environmental Impacts Table A - Appraisal Groups (Cont)

GROUP 4: POLICIES AND PLANS : FLOODING				
POLICY	**AUTHORITY**	**INTEREST**	**DIVERSION**	**COMMENTS**
25. Structure Plan Para 71	Buckinghamshire County Council	Presumption against development in area liable to flood.	Policy not affected. Effects of increased runoff on receiving watercourses of minor significance	
26. Deposit Draft Structure Plan Proposed Modifications Policy W5	Buckinghamshire County Council	Area at risk from flooding.	(As above)	
27. Draft Local Plan Policy EP12	South Bucks District	Protection from flooding.	(As above)	

Environmental Impacts Table B - Land Use

EXISTING LAND USE	AREA REQUIRED				
	Area for Carriageway, and other hard surfaces (ha)	**Area for embankments, and other landscaping (ha)**	**Total Area (ha)**	**Area required during construction**	**Comments**
Agricultural Land (Grade 2) (Productive)	0.76	0.30	1.06	Site compound areas would be located as indicated in planning application for flood channel. Environment Agency would make fill material available for embankment from line of channel	Temporary requirements only
Agricultural Land (Fallow)	0.13	0.06	0.19		Temporary requirements only
Land within existing highway boundary	0.29	-	0.29	-	Temporarily surfaced highway verge area
Community Land	-	-	-	-	
Designated Development Land in Plans	-	-	-	-	
TOTAL	0.89	0.36	1.25	-	-

Environmental Impacts Table C - Mitigation

ISSUE	MITIGATION MEASURE	LOCATION, PURPOSE, AND FORECAST BENEFIT	RESIDUAL EFFECTS	CAPITAL COST	FORECAST MAINTENANCE REQUIREMENT, METHOD AND COST	COMMENTS
Air Quality (dust)	Damping down in dry conditions, wheel washing etc.	To reduce dust (particulate) generation from construction activity	Possible dust nuisance during construction and restoration.	-	To be carried out by contractor.	
Cultural Heritage	MWEFAS Project Archaeologist would be on site during top soil stripping for area outside that required for MWEFAS scheme and would act as Project Archaeologist for diversion scheme	Construction areas - in case of uncovering features of archaeological interest	Potential loss of below ground archaeological features	Unknown	None	
Disruption	Careful routing of construction and decommissioning traffic, restriction of working hours, restriction of types of plant and machinery used, specifying and compliance with noise level limits	Reduction in severity of construction and decommissioning noise	Possible disturbance to residential properties	-	To be carried out by contractor	
	Careful construction practices	Control of dust	Possible dust nuisance	-	As above	
	Traffic management scheme	Prevent delays during construction and decommissioning	Possible delays to traffic	-	As above	

Environmental Impacts Table C - Mitigation (Cont.)

ISSUE	MITIGATION MEASURE	LOCATION, PURPOSE, AND FORECAST BENEFIT	RESIDUAL EFFECTS	CAPITAL COST	FORECAST MAINTENANCE REQUIREMENT, METHOD AND COST	COMMENTS
Ecology and Nature Conservation	Minimise land take to habitats of importance	M4 Elm Copse (Habitat G on *Figure 8.1*) - minimise habitat loss	Partial habitat loss - moderate local effect	-		
		Western Field (Habitat F on *Figure 8.1*) - minimise habitat loss	Partial habitat loss - slight local effect	-		
	Tree and shrub planting	M4 embankment and adjacent to Glebe Close - recreate habitat supporting species protected from sale by statute	Partial loss of habitat for a species protected by statute - moderate local effect	-	Routine maintenance	
	Natural regeneration of tall semi improved grassland	Western field (Habitat F on *Figure 8.1*). Recreate good invertebrate habitat	Partial loss of invertebrate habitat - slight local effect	-	-	Soil preparation should not include fertilisation in order to retain the existing soil fertility and pH.

Environmental Impacts Table C - Mitigation (Cont.)

ISSUE	MITIGATION MEASURE	LOCATION, PURPOSE, AND FORECAST BENEFIT	RESIDUAL EFFECTS	CAPITAL COST	FORECAST MAINTENANCE REQUIREMENT, METHOD AND COST	COMMENTS
Landscape Effects	Visual barrier (2m high)	During operational period, barrier on northern embankment, from Marsh Lane to MWEFAS overbridge. Barrier to be relocated to permanent embankment following decommissioning, to assist mitigation of views prior to establishment of planting.	Visual intrusion until planting establishes	-	Routine maintenance	
	Tree and Shrub planting	Along embankment within highway boundary to replace vegetation lost, and adjacent to Glebe Close	Proposed planting would take 15-20 years to establish and grow to similar height and density as existing vegetation to provide visual screen to properties	-	Routine maintenance	
Land Use	Fence off site boundary	Protect land adjacent to site boundary	Effects to adjacent land	-	To be carried out by contractor	
Pedestrians etc.	Retain access along footpaths with provision of gates/stiles if required	Footpaths 18 and 23	Slight loss of visual and aural amenity	-		
Vehicle Travellers	Signs, road marking, speed limit	Before, during and after diversion to minimise effect of diversion on driver stress and maintain operational safety	Driver stress remains high	-		
	Lighting of diversion	Throughout operation to minimise driver stress at night and maintain operational safety				

Environmental Impacts Table C - Mitigation (Cont.)

ISSUE	MITIGATION MEASURE	LOCATION, PURPOSE, AND FORECAST BENEFIT	RESIDUAL EFFECTS	CAPITAL COST	FORECAST MAINTENANCE REQUIREMENT, METHOD AND COST	COMMENTS
Water Quality and Drainage	Sediment traps and drainage Drainage system using channels, pipes and ditches.	Edge of construction area to mitigate against runoff and pollution. To discharge runoff from motorway diversion	Potential for accidental pollution Increased discharge rate to Roundmoor Ditch and decreased discharge rate to Cress Brook.	-	- Routine Maintenance	
Geology and Soils	Careful stripping , storing and replacing of soil. Stockpiles not to exceed 2m in height Limit land take and fence site boundary	To maintain soil quality Keep loss of Grade 2 agricultural land to a minimum	Slight reduction in soil quality Land restored after diversion removed.	-	- To be carried out by contractor	

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APPENDIX 5.1

AIR QUALITY

APPENDIX 5.1 AIR QUALITY

Vehicle Emissions

Road vehicles emit a wide variety of pollutants some of which are considered more significant due to their harmful effects and the volumes produced per vehicle. Emissions from motor vehicles represent a significant proportion of total emissions in the UK of certain pollutants. The National Atmospheric Inventory, published annually in the Digest of Environmental Protection and Water Statistics[4], lists the relative contributions made by major sources to total emissions of a range of pollutants. Relative contributions of these major pollutants in the UK for 1992 (the latest year available) are shown in Table 1. This shows that road transport contributes the major fraction of carbon monoxide (CO) emissions over the UK as a whole and is the largest single source of oxides of nitrogen (NOx) and black smoke (PM) emissions.

Table 1 UK Emissions of Air Pollutants 1992 (k tonnes)

Source	NOx	%age	CO	%age	CO_2 (mt)	%age	HC	%age	Black Smoke	%age	SO_2	%age
Road Transport	1398	51	6029	90	30	19	949	37	215	47	62	2
Power Stations	694	25	45	1	51	33	12	-	25	5	2427	69
Domestic	73	3	258	4	23	15	36	1	129	28	117	3
Commercial	58	2	7	-	9	6	1	-	4	1	84	3
Industrial	333	12	105	2	35	23	1395	54	20	4	735	21
Other	192	7	263	3	7	4	163	7	64	15	74	2
Total	**2748**		**6707**		**155**		**2678**		**457**		**3499**	

The amount of pollution produced by a vehicle depends on the engine size and type, the age and state of maintenance, the operating condition and the speed of the vehicle.

In accordance with the method recommended in the DMRB, this study has selected CO, benzene (to represent hydrocarbons), NO_2 and PM as the main pollutant indicators used to assess air quality effects from road traffic pollution.

Legislation and Air Quality Standards

National and international standards exist which set guide/limit values for various pollutant concentrations in the atmosphere. In addition, various national and international regulations control motor vehicle design and the fuels they use. The standards and regulations in brief are summarised below.

Emissions from petrol engines have been subject to increasing control, primarily in response to a series of EC directives, since the 1970's. The emission controls range from the introduction of unleaded fuel and catalytic converters as standard, to more recent controls on the chemical composition of the fuel. Emissions from diesel engines are generally less regulated as less gaseous emission takes place and less fuel is consumed. Emission requirements are similar to petrol engines.

Methods and Assumptions

The DMRB recommended method of air quality assessment has been used for this assessment. Areas within 200m of the road are identified which are sensitive to changes in air quality (those areas where people spend a nominal 8-hours in a 24-hour period). Preliminary calculations are carried out to estimate the air quality at the sensitive receptor locations for the existing situation, the Do-Minimum situation (i.e. the predicted conditions in the design year if the scheme is not constructed) and also for the design year (year of opening for the purpose of this scheme). The information required for the assessment includes peak hour traffic flow, speeds and distances between the receptors and carriageway centreline for each of the situations. In the case of this assessment the model has been slightly adapted as the existing and design years (also the year of opening) have been taken to be the same year, therefore the Do-Minimum situation is exactly the same as the existing situation, and is not calculated separately.

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APPENDIX 6.1

EXTRACTS FROM EXISTING ARCHAEOLOGICAL SURVEYS

EXTRACT FROM MWEFAS ARCHAEOLOGICAL EVALUATION, STAGE 3, 1991

Marsh Lane east

The geology here was generally similar to Marsh Lane west with silty loam overlying gravel. To the south, however, the course of an old river channel is visible as a surface feature and is full of peat of over 1m in depth. This peat filled channel continues into area E south of the motorway and becomes deeper beyond Lot's hole. Areas to the east of this channel and north of the M4 are on gravel.

Marsh Lane east site 1

This site was located on the margins of the peat filled channel centred on trench D198. It comprised a charcoal patch, a pit full of burnt flint and a possible midden (C193-197,206-210 [shown as C196 on plan 7a] containing struck flints and Middle Bronze Age (Deverel-Rimbury) pottery with carbonised residues. Finds of burnt flint, pottery, and flint tools appeared to occur only on the top of the peat.

Marsh Lane east site 2

This comprised a trench across a ring ditch (F127) observed on aerial photographs and in geophysical survey. A second ring ditch seen on aerial photographs and in the geophysical survey straddles the application boundary and was not further evaluated. Both the aerial photographic plot out and geophysical survey (stage 2 evaluation Appendix) suggested the ring ditch was egg-shaped in plan perhaps with causeways. It is about 17m in diameter. This feature was hard to recognise due to its upper fills having being infilled with gravel, closely similar in character to the natural gravel. The ditch was 2m across at the top and 1.3m deep, with a V-shaped profile. Seven sherds of ?Early Bronze Age pottery (probably from the same vessel) were recovered from the primary silts. The sherds were not closely diagnostic and came from a somewhat globular vessel-unusual but not unknown in Early Bronze Age contexts (Richard Bradley pers. comm.) Nearby a second feature (F130, trench D221) was thought to be another portion of the ring ditch but it was shown to be either a ditch terminal or a pit. It was of different character and profile from the ring ditch and produced no finds. The centre of the ring ditch probably lies to the south east of F127 with the ditch circuit running between trenches D208 and D209.

Marsh Lane East- Probable site

A single pit (F126) was found in trench D220. This was sited on the margins of the peat filled channel in a similar position to Marsh Lane East 1.

A number of undated isolated ?postholes were found in the general vicinity of the ring ditch but which are difficult to interpret.

Area E (Figs. 8-9, 19,22)

174 trenches

Lot's Hole (Fig. 19, 21)

The majority of the area comprised silty loam overlying gravel with the calcareous sand present in some trenches. To the west the ground sloped gently towards the Lot's Hole stream. Here at its deepest c. 1.5m of peat overlay gravel, which in turn was overlain by colluvium. The peat was sampled for pollen analysis.

Lot's Hole site 1

The stage 2 survey highlighted the presence of cropmarks, coincident in part with scatters of Medieval, Roman and Prehistoric pottery, struck flints and burnt flint. The Medieval pottery formed a dense cluster. The main feature of the cropmarks were linear features suggesting trackways or fields with a possible pit group just beyond the north eastern section of the proposal area.

The trenching revealed a high density of subsoil features spreading from E5 in the north to E11 and E25 in the south. These comprised ditches, gullies, pits, postholes and a hearth. The majority of the dated features appear to be of Medieval date and it is clear that a Medieval settlement, presumably a farmstead, is present. Features of Medieval date appear to be spread over an area of about 120 x 80m in extent.

Lot's Hole site 2

This is confined largely within trench E55. It comprises a spread of burnt flint, struck flint and Late Bronze Age/ Early Iron Age pottery in modest quantities

(C 516). A small ring of copper alloy wire may or may not be a coincidental find. A fragment of human tibia was also recovered. The site lies at the margins of one of the denser areas of burnt flint- a boundary that is reflected in the test pit data. The test pits did not produce any exceptional data relating to this site with the broken flint axe presumably relating to much earlier activity.

Some certain Roman pottery was recovered from excavated features. There were few sherds overall and were abraded. They were clearly residual in most cases.

Lot's Hole site 3

This site is not securely dated in comparison to site 1 but is likely to be of Saxon date although an Iron Age/Roman date cannot be entirely ruled out. This dating depends on the identification of grass tempered sherds. It is centred on E51 and may cover an area of 130 x 60m overlapping with site 1. This area is coincident with a dense spread of burnt flint and the small but clustered spread of hand made pottery from the stage 2 fieldwork.

Lot's Hole - possible site

A charcoal spread with burnt flint and a few struck flints (C 508) occurred in trench E1. This appears to be of similar character if less extensive, to other prehistoric sites described above (eg Amerden Lane east site 1).

MAIDENHEAD, WINDSOR AND ETON FLOOD ALLEVIATION SCHEME
1991

APPENDIX 5
PALAEO- ENVIRONMENTAL POTENTIAL

Seven locations were discovered in which peat deposits had accumulated. Four of these were sampled for pollen and macro remains where present. Two were subject to a more detailed examination by Michael Keith- Lucas. All these locations have some palaeo- environmental potential. The thick well- preserved deposits are best for very detailed pollen sampling. Those adjacent to archaeological sites are also more likely to register human interference with the environment.

Area D/E (Lots Hole)

A peat filled channel was traceable from Area D (trenches D196 and D220) through to Lot's Hole. In trench E3 about 1.3m of peat was buried by colluvial deposits and was sampled at 0.1m intervals. The peat was well preserved and started to accumulate in late glacial times.
The channel in trench D196 was somewhat shallower with 0.6m of peat. The top of the peat contained burnt flint and prehistoric pottery buried beneath a grey silt. It is likely that this pottery derived from the adjacent Middle Bronze Age site (Marsh Lane East site 1). A Medieval site (Lot's Hole site 1) and possible prehistoric sites (Marsh Lane East and Lot,s Hole) are also adjacent to this channel.

MAIDENHEAD, WINDSOR AND ETON FLOOD ALLEVIATION SCHEME 1991

APPENDIX 7- NOTES

Figures displaying finds from trenches exclude all finds from layers or features unless the features are clearly of Post- medieval date but with earlier finds.

Also for the plans all fragments of pottery from any one catalogue record are shown as a single symbol.

Finds of bashed lumps and core fragments are displayed using the same symbol as spalls, as all three categories are often of dubious authenticity.

The flint catalogue refers to intact or broken flakes or blades etc. this is an indication of the potential for producing a metrical analysis at a future date if required. The categories 'blade', flake' 'possible broken blade' etc. have been assessed by eye only but do give an approximation as to the possible date of any closed assemblages.

Flints described as 'modern' are those thought to have been made by recent agricultural activity or are modern imports due to the liming of clayey soils. Some flakes on Medieval sites may be chance occurrences due to the use of flint nodules in wall construction.

Four categories of feature validity were ascribed;
1) Certain archaeological features.
2) Possible archaeological features (Bracketed).
3) Doubtful archaeological features (not displayed).
4) Natural features (not displayed).

'F' denotes a certain or probable feature cutting the subsoil.
'C' denotes a layer or a possible feature cutting the subsoil.
'CP' denotes a charcoal patch.

Areas of potential

The areas of potential of the summary plans are graded into three categories:

1) Certain sites:
Where certain archaeological deposits are present with further deposits highly probable in the vicinity.

2) Possible sites:
Isolated archaeological features, artefact clusters or burnt flint spreads where there is some doubt over the nature and extent of these and any undiscovered deposits in the vicinity.

3) Dubious sites:
Features of uncertain date, nature or authenticity.

Areas of Palaeo- environmental are marked 'p'.

Acknowledgements

I am most grateful for the help and advice in the preparation of this report from;

Jackie Bates, Richard Bradley, Paul Chadwick, Peter Doran, Michael Farley, Michael Fulford, Michael Keith-Lucas, Julie Lovett, Nick Marples, Mark Robinson, Isabelle Ruben, Robin Taylor, Leigh Torrance, Richard Turnbull and Rhiannon Williams.

MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90

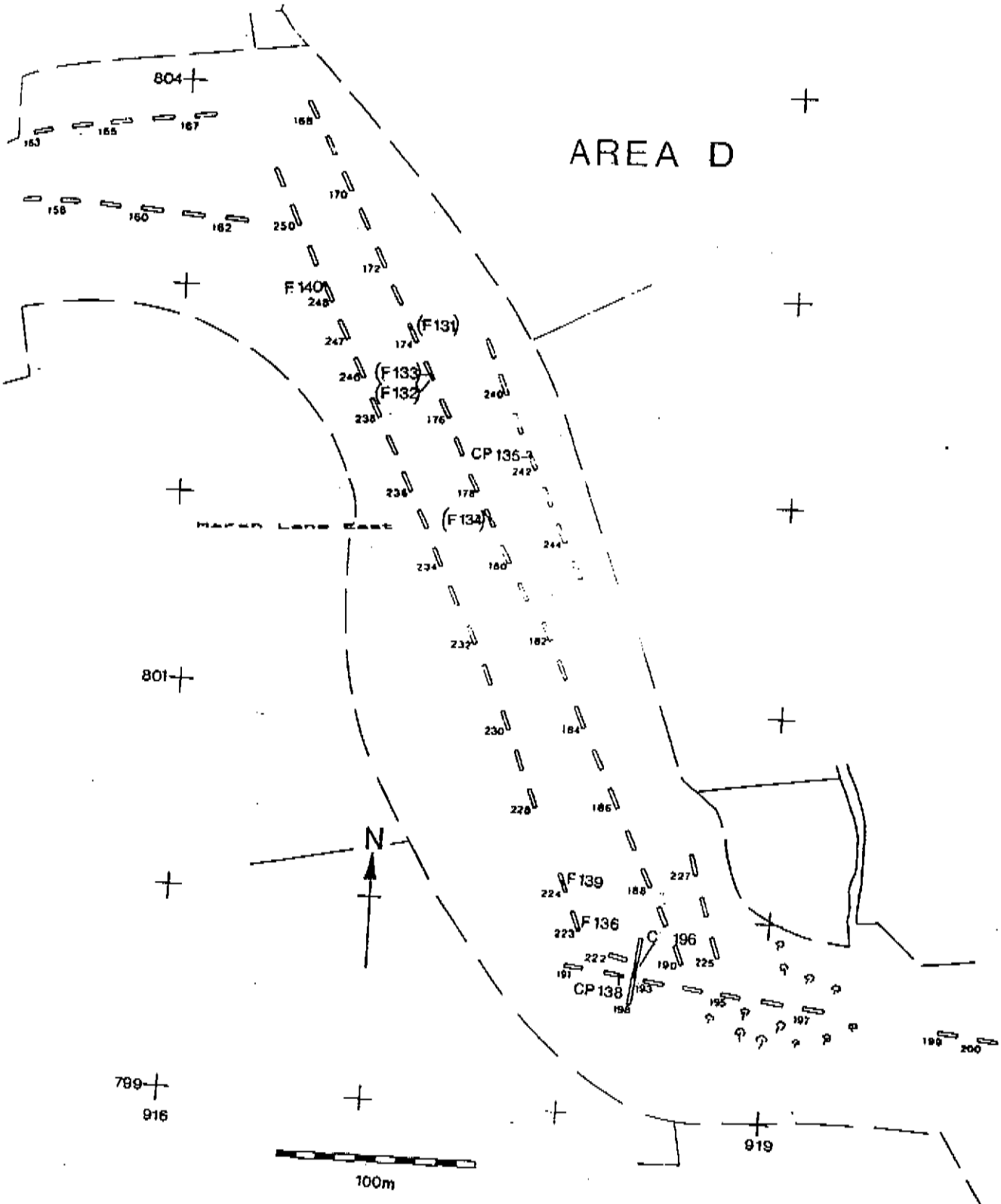

Fig. 7a

MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90

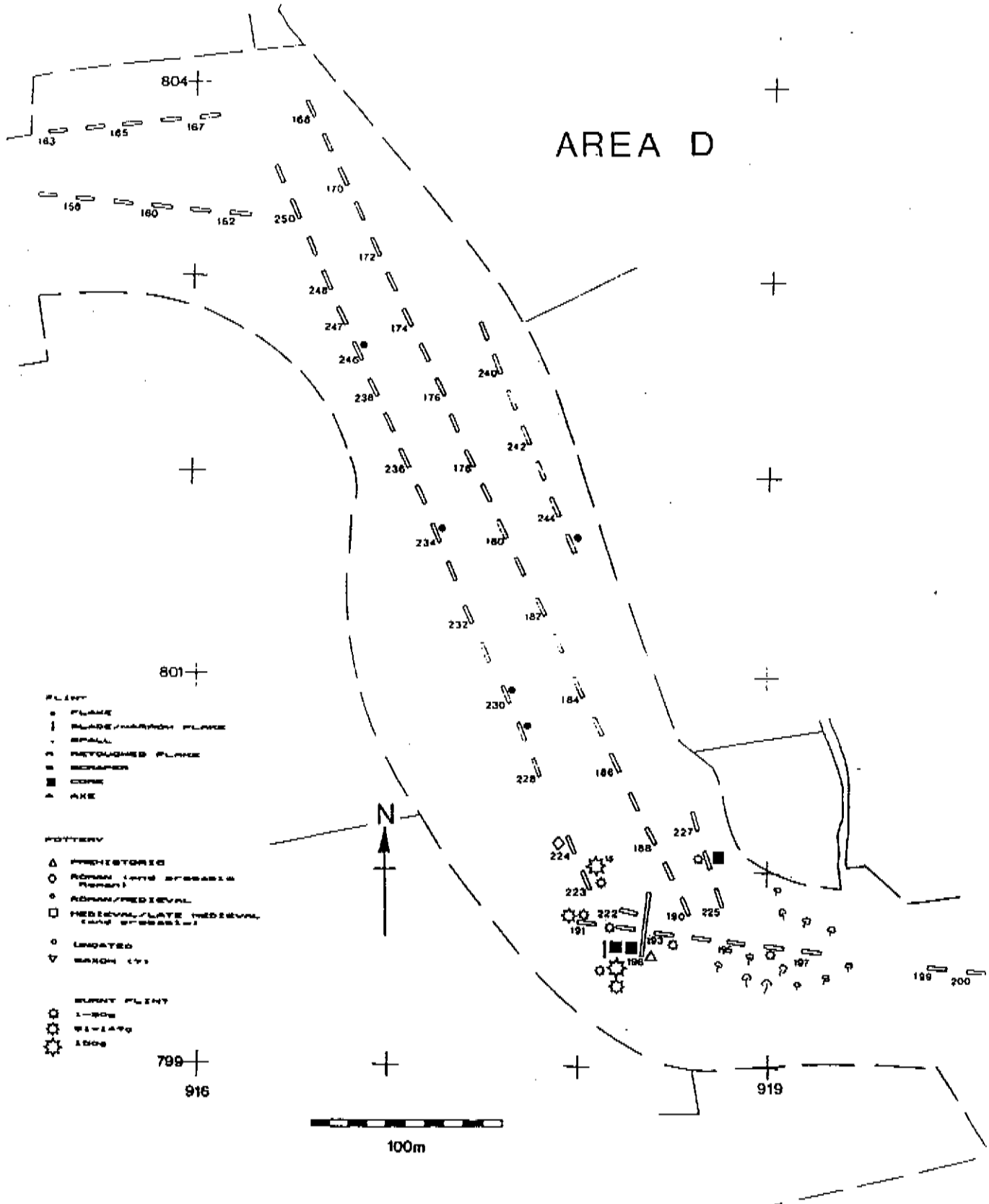

Fig. 7b

MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90

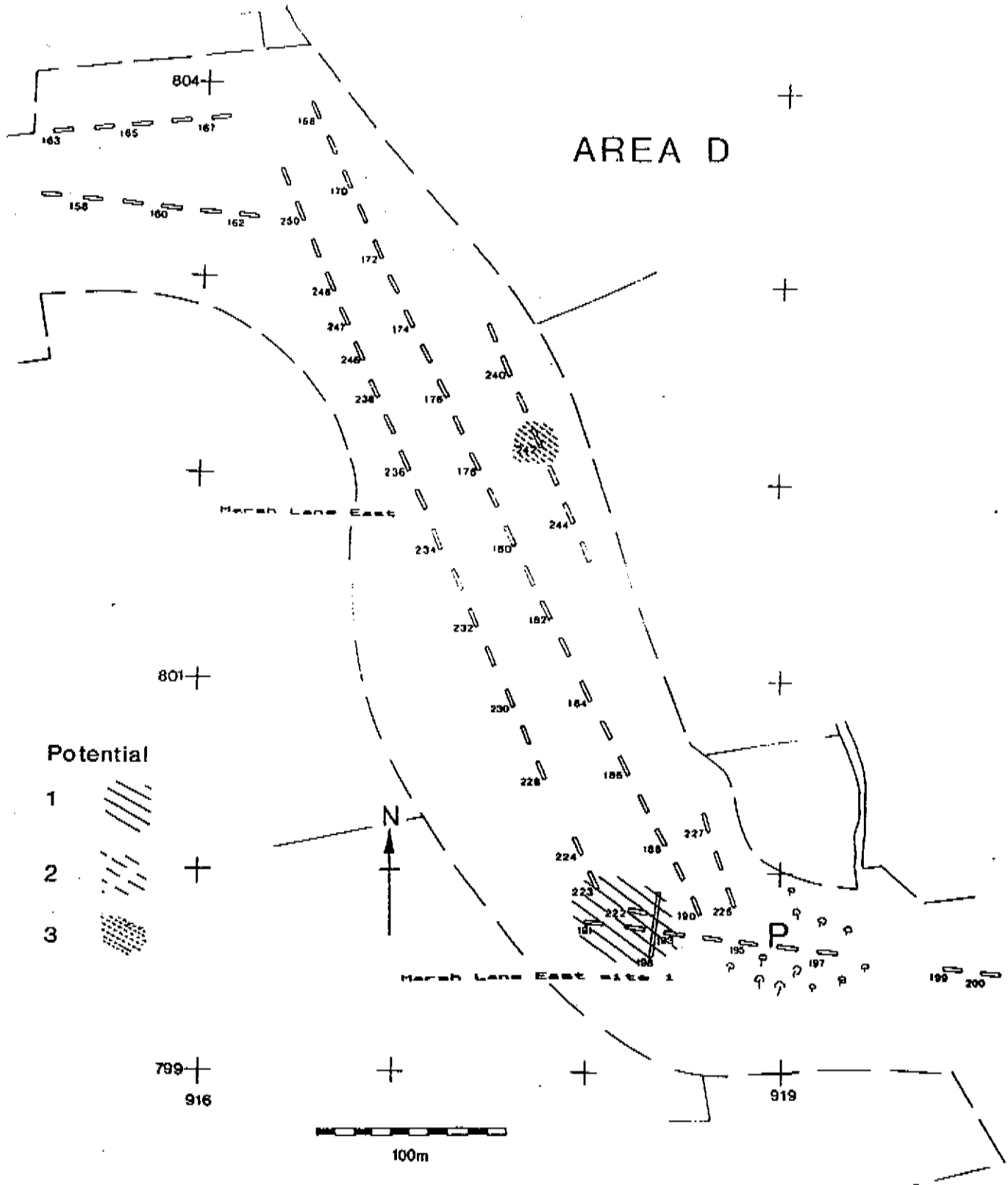

Fig. 7c

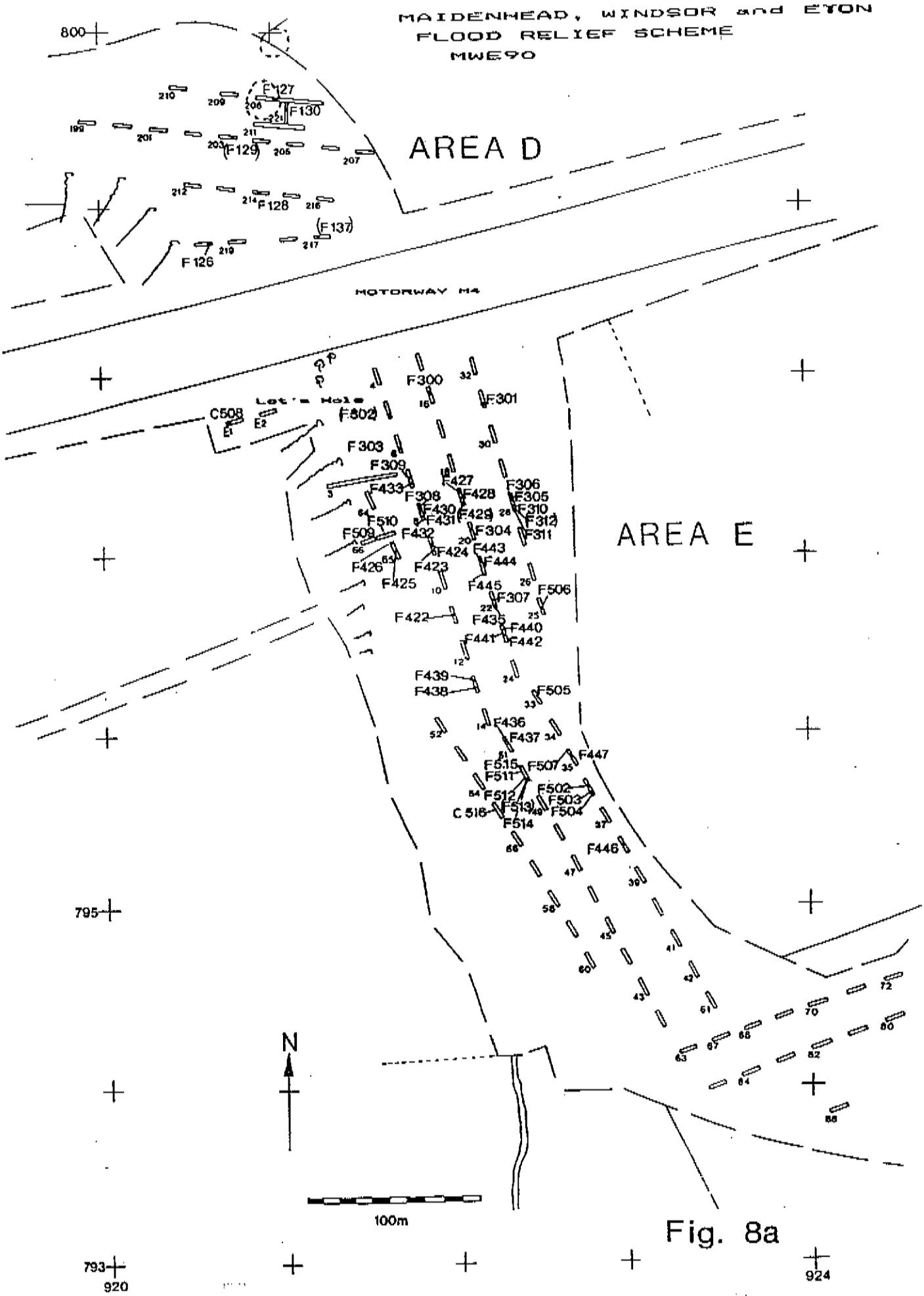
MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90
AREA D
AREA E
MOTORWAY M4
Let's Hole
F127
F130
F129
F128
F137
F126
F300
F301
F302
F303
F309
F427
F306
F433
F308
F428
F305
F430
F310
F510
F431
F429
F312
F509
F432
F304
F311
F424
F443
F426
F423
F444
F425
F445
F307
F506
F422
F435
F440
F441
F442
F439
F438
F505
F436
F437
F447
F515
F507
F511
F502
F512
F503
C516
F513
F504
F514
F446
N
100m
795
793
920
924

Fig. 8a

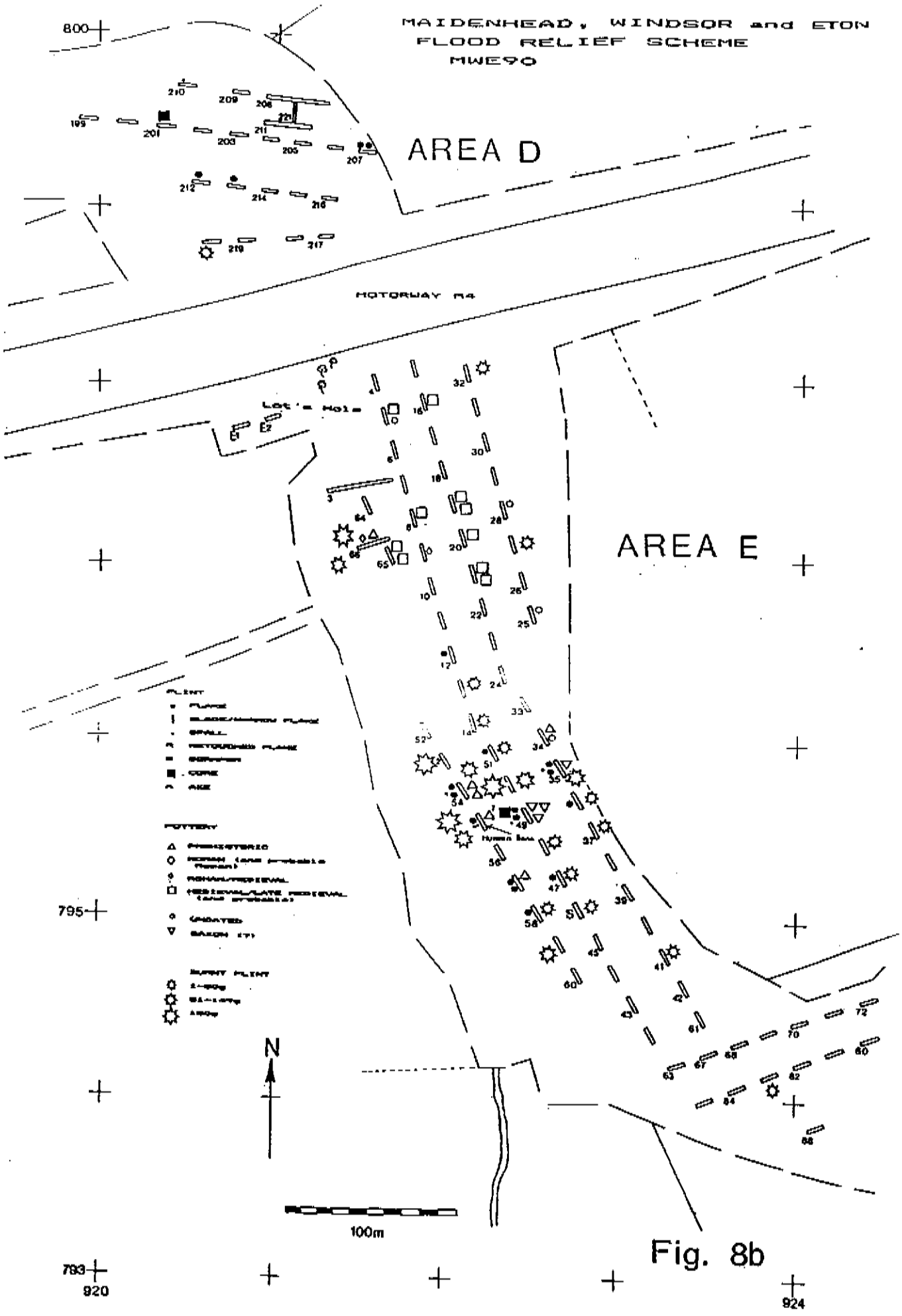
MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90
AREA D
AREA E
MOTORWAY M4
800
795
783
920
924
N
100m

Fig. 8b

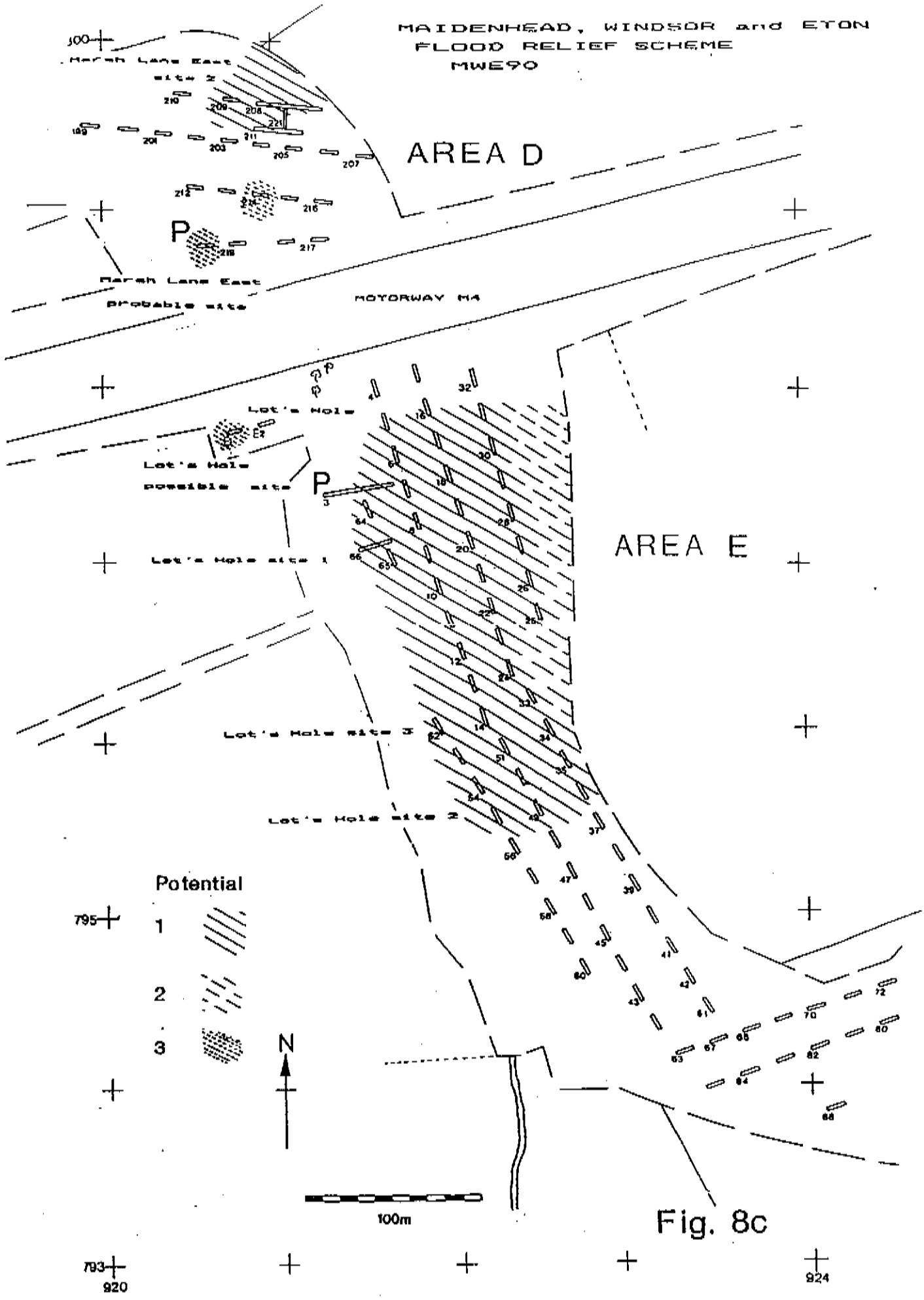
MAIDENHEAD, WINDSOR and ETON
FLOOD RELIEF SCHEME
MWE90
AREA D
AREA E
Marsh Lane East
site 2
Marsh Lane East
probable site
MOTORWAY M4
Let's Hole
Let's Hole
possible site
Let's Hole site 1
Let's Hole site 3
Let's Hole site 2
P
P
P
Potential
1
2
3
N
100m
795
793
920
924

Fig. 8c

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APPENDIX 7.1

NOISE CHARACTERISTICS AND UNITS

APPENDIX 7.1 NOISE CHARACTERISTICS AND UNITS

A sound wave is a small regular disturbance of atmospheric pressure. The human ear detects these variations in pressure producing the sensation of hearing. The ear can detect a very wide range of pressure variations and therefore the range of hearing in a normal human being is very wide. It has been found that the human ear responds to sound in a logarithmic fashion. Therefore, a logarithmic scale is used to convert the pressure values into manageable numbers. The dB (decibel) is the unit used to describe sound (or noise) levels. The usual range of values is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Table A7.1 - Noise Levels for Common Noise Sources

Noise Level dB(A)	Noise Source
0	faintest audible sound
30-40	whisper
40-50	quiet office
50-60	normal speech
70	loud radio
80	busy street
90	heavy lorry at 7m distance
100	jet aircraft 250m overhead
120	threshold of pain

Most people with normal hearing can hear sounds in the frequency range 20 - 20,000 Hz. The ear is not equally sensitive to sound within this frequency range. The ear attenuates sound at low and very high frequencies compared with the frequencies in between. Therefore measuring a sound made up of a number of different frequencies across the audible spectrum (such as noise from traffic or construction sites), with all frequencies unweighted would give a level which would not correlate very well with what a human being would actually hear. It is therefore necessary to measure the sound with the frequencies suitably attenuated to match the way in which the ear attenuates the frequencies. This is achieved by using an electronic filter called the 'A' weighting in sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBL_A.

An increase in a noise level of 10 dB(A) generally corresponds to a subjective doubling of loudness. Likewise, a reduction in noise level of 10 dB(A) corresponds to a subjective halving of the noise level. Because of the logarithmic scale used for noise levels, when two noises of the same level are added together, the total noise level is 3 dB(A) higher than each of the individual noise levels i.e. 72 dB(A) + 72 dB(A) = 75 dB(A).

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB(A) level. Where the noise level varies over time the measured dB(A) level will vary as well. It is therefore inappropriate to represent fluctuating noise by simply using a dB(A) value. In order to overcome this problem noise indices have been developed for road traffic noise and construction noise. Traffic noise is assessed in terms of the L_{A10} index. L_{A10} is the noise level exceeded for 10 % of a specified time period usually 0600-2400 hours. Noise from construction sites is assessed in terms of the L_{Aeq} index. L_{Aeq} is defined as the

notional continuous noise level which is equivalent to the varying noise over the same time period. L_{Aeq} is an expression of the total noise energy measured over a specified time period. For daytime construction noise assessments the L_{Aeq} is usually evaluated over a typical 12 hour working day e.g. from 7 am to 7 pm and is denoted $L_{Aeq(12\ hour)}$.

A small change in distance between a road and a receiver does not have a great effect on the overall traffic noise level at the receiver. The effect is greater for properties very close to the road than those which are further away. For each halving of the distance between the road and the house, ignoring ground absorption effect, the traffic noise level will increase by $3dBL_{A10}$. Similarly for each doubling of distance from the road the traffic noise level would reduce by $3dBL_{A10}$.

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APPENDIX 8.1

LIST OF CONSULTEES CONTACTED FOR PREVIOUS ASSESSMENT WORK

APPENDIX 8.1 LIST OF CONSULTEES CONTACTED FOR PREVIOUS ASSESSMENT WORK

M4 SCHEME

- English Nature
- Local Authorities
- Ministry of Agriculture, Fisheries and Food
- Buckinghamshire, Berkshire and Oxfordshire Naturalist Trust
- Amateur Entomological Society
- Biological Records Centre
- Bird Recorder for Buckinghamshire
- British Arachnological Society
- British Bryological Society
- British Butterfly Conservation Society
- British Dragonfly Society
- British Herpetological Society
- Herpetological Conservation Trust
- Herpetofauna Consultants Limited
- British Lichen Society
- British Mycological Society
- Buckinghamshire County Museum
- Buckinghamshire Badger Group
- Conchological Society of Great Britain
- Forestry Enterprise
- Former National Rivers Authority (NRA) - Thames Region
- Plant Life
- Royal Entomological Society of London
- Royal Society for the Protection of Birds (RSPB)
- Malacological Society of London
- Mammal Society
- National Trust
- Otter Trust
- Vincent Wildlife Trust
- Woodland Trust

MWEFAS SCHEME

- Former NRA
- English Nature
- Institute of Fishery Management
- Thames Fisheries Consultative Council
- Buckinghamshire, Berkshire and Oxfordshire Naturalist Trust
- RSPB
- Slough Urban Wildlife Group.

APPENDIX 9.1

VISUAL IMPACT SCHEDULE

VISUAL IMPACT SCHEDULE : APPENDIX 9.1

		EXISTING ROAD		DIVERSION					
Ref. No.	Address/ Viewpoint Type	Distance to centre line	Level of Impact of Existing Road [2]	Distance to Centre-line (m)	Traffic[1]	Impact During Operation and Year 1 after Reinstatement [2]	Impact Year 15 after Reinstatement (Winter)[2]	Impact Year 15 after Reinstatement (Summer)[2]	Mitigation/ Comments
1	Marsh House Marsh Lane - Detached	1100	Slight adverse	1045	PV	Slight adverse	No change	No change	Effect from garden/first floor
2	Kashmir Marsh Lane - Detached	1045	Slight adverse	990	PV	Slight adverse	No change	No change	Effect from garden
3	Hunters Moon Marsh Lane	1030	Slight adverse	970	PV	Slight adverse	No change	No change	Effect from garden
4	Foxlen Marsh Lane - Detached	1045	Slight adverse	995	PV	No change	No change	No change	Effect from first floor
5	Madeira Marsh Lane -Semi Detached	1040	Slight adverse	985	PV	No change	No change	No change	Effect from first floor
6	Teesdale Marsh Lane-Semi Detached	1035	Slight adverse	980	PV	No change	No change	No change	Effect from first floor
7	Flats 1-6 Ye Meads - Terrace	805	Slight adverse	805	PV	No change	No change	No change	Effect from second floor
8	Ye Meads Cottage - Terrace	752	Slight adverse	752	PV	No change	No change	No change	Effect from first floor
9	2, Ye Meads - Terrace	750	Slight adverse	750	PV	No change	No change	No change	Effect from first floor
10	3, Ye Meads - Terrace	748	Slight adverse	748	PV	No change	No change	No change	Effect from first floor

Notes:

1 L At ground level
NV Not visible
PV Partially visible on embankment
V Widely visible on embankment

2 Future year impacts are relative to the existing impacts

VISUAL IMPACT SCHEDULE : APPENDIX 9.1 (Cont)

		EXISTING ROAD		DIVERSION					
Ref. No.	Address/ Viewpoint Type	Distance to centre line	Level of Impact of Existing Road [2]	Distance to Centre-line (m)	Traffic[1]	Impact During Operation and Year 1 after Reinstatement [2]	Impact Year 15 after Reinstatement (Winter)[2]	Impact Year 15 after Reinstatement (Summer)[2]	Mitigation/ Comments
11	4, Ye Meads - Terrace	747	Slight adverse	747	PV	No change	No change	No change	Effect from first floor
12	5, Ye Meads - Terrace	745	Slight adverse	745	PV	No change	No change	No change	Effect from first floor
13	6, Ye Meads - Terrace	746	Slight adverse	746	PV	No change	No change	No change	Effect from first floor
14	7, Ye Meads Semi Detached	740	Slight adverse	740	PV	No change	No change	No change	Effect from first floor
15	Salcomb Regis Ye Meads - Semi Detached	739	Slight adverse	739	PV	No change	No change	No change	Effect from garden/first floor
16	Silvermead Ye Meads - Semi Detached	734	Slight adverse	734	PV	No change	No change	No change	Effect from garden/first floor
17	Meads End Ye Meads - Semi Detached	732	Slight adverse	732	PV	No change	No change	No change	Effect from garden/first floor
18	West Town Farm Farm Road - Detached	515	Slight adverse	475	PV	Slight adverse	No change	No change	Restricted views from first floor
19	The Badgers (No.1) Glebe Close - Detached	90	Slight adverse	90	PV	No change	Slight beneficial	Slight beneficial	Effect from garden. Mitigation by erection of visual barrier at top of diversion and new planting

Notes:

1 L At ground level
NV Not visible
PV Partially visible on embankment
V Widely visible on embankment

2 Future year impacts are relative to the existing impacts

VISUAL IMPACT SCHEDULE : APPENDIX 9.1 (Cont)

		EXISTING ROAD		DIVERSION					
Ref. No.	Address/ Viewpoint Type	Distance to centre line	Level of Impact of Existing Road [2]	Distance to Centre-line (m)	Traffic[1]	Impact During Operation and Year 1 after Reinstatement [2]	Impact Year 15 after Reinstatement (Winter)[2]	Impact Year 15 after Reinstatement (Summer)[2]	Mitigation/ Comments
20	Ty Glas (No.2) Glebe Close - Bungalow	80	Slight adverse	78	V	Slight adverse	Slight beneficial	Slight beneficial	As above
21	September House (No.3) Glebe Close - Detached	85	Moderate adverse	80	V	Moderate adverse	Slight beneficial	Slight beneficial	As above
22	Public Footpath (No. 23) Glebe Close	85	Slight adverse	65	V	Slight adverse	Slight beneficial	Slight beneficial	Effect from footpath. Mitigation by erection of visual barrier at top of diversion and new planting
23a	Public Footpath (No. 18) Glebe Close to Marsh Lane	290	Slight adverse	245	V	Moderate adverse	No change	No change	Temporary effect on footpath
23b	Public Footpath (No. 18) Glebe Close to Marsh Lane	540	Slight adverse	475	V	Slight adverse	No change	No change	Temporary effect on footpath
24	Marsh Lane overbridge	0	Substantial adverse	0	V	Slight adverse	No change	No change	Effect from road/pavement
25	19, Marsh Lane Dorney Reach - Detached	355	Slight adverse	385	PV	No change	No change	No change	Effect from first floor
26	17, Marsh Lane Dorney Reach - Detached	380	Slight adverse	415	PV	No change	No change	No change	Effect from first floor
27	15, Marsh Lane Dorney Reach - Detached	400	Slight adverse	435	PV	No change	No change	No change	Effect from front garden/first floor
28	11, Marsh Lane Dorney Reach - Terrace	415	Slight adverse	450	PV	No change	No change	No change	Effect from front garden/first floor
29	9, Marsh Lane Dorney Reach Terrace	425	Slight adverse	465	PV	No change	No change	No change	Effect from front garden/first floor

Notes:

1 L At ground level
NV Not visible
PV Partially visible on embankment
V Widely visible on embankment

2 Future year impacts are relative to the existing impacts

VISUAL IMPACT SCHEDULE : APPENDIX 9.1 (Cont)

		EXISTING ROAD		DIVERSION					
Ref. No.	Address/ Viewpoint Type	Distance to centre line	Level of Impact of Existing Road [2]	Distance to Centre-line (m)	Traffic[1]	Impact During Operation and Year 1 after Reinstatement [2]	Impact Year 15 after Reinstatement (Winter)[2]	Impact Year 15 after Reinstatement (Summer)[2]	Mitigation/ Comments
30	7, Marsh Lane Dorney Reach - Terrace	430	Slight adverse	470	PV	No change	No change	No change	Effect from front garden/first floor
31	5, Marsh Lane Dorney Reach - Terrace	435	Slight adverse	480	PV	No change	No change	No change	Effect from garden/first floor
32	Public footpath (No. 5) Dorney Reach	410	Substantial adverse	450	PV	No change	No change	No change	Effect from footpath
33	Public bridleway (No. 8) Court Lane, Dorney	1000	Slight adverse	1060	PV	No change	No change	No change	Effect from bridleway
34	Court Lane Dorney	760	Slight adverse	810	PV	No change	No change	No change	Effect from lane
35	Lake End Road overbridge	0	Moderate adverse	370	V	No change	No change	No change	Effect from overbridge/pavement
36	Tythe Barn Lake End Road - Detached	0	Slight adverse	900	PV	Slight adverse	No change	No change	Effect from front garden/first floor

Notes:

1 L At ground level
NV Not visible
PV Partially visible on embankment
V Widely visible on embankment

2 Future year impacts are relative to the existing impacts

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GLOSSARY

GLOSSARY

Agricultural Land Classification	Classification of agricultural land into one of five grades: Grade 1 being the best and most versatile land, Grade 5 having severe limitations for agricultural use.
Conservation Area	Area designated by the Local Planning Authority as being of special architectural or historic interest, the character of which it is desirable to preserve or enhance. A statutory designation protected under the *Planning (Listed Buildings and Conservation Areas) Act 1990.*
County Sites and Monuments Record (SMR)	A record of sites of archaeological interest maintained by the county council.
Decibel dB	The intensity of sound. The A-weighted decibel (dB(A)) is frequency weighted to compensate for the varying sensitivity of human ears to sounds of different frequencies.
Environmental Assessment (EA)	An appraisal of the effects of a scheme on various environmental factors.
Environmental Statement (ES)	Presentation of the results of an EA.
Ephemeral	A watercourse with intermittent flow.
Geomorphological	A geological attribute that forms a feature of the landscape.
Green Belt	An area of land designated to safeguard it from inappropriate development in order to maintain its open nature and restrict urban sprawl.
Habitat	An area of broadly similar vegetation/topography which supports an associated assemblage of animal and plant species.
Listed Building	Building of special architectural or historic interest included in the statutory list. A statutory designation protected under the *Planning (Listed Building and Conservation Areas) Act 1990.*
Local Plan	A Plan setting out detailed proposals and policies for the development and use of land within the district/borough. Local Plans are required to be in conformity with the Structure Plan.

Mitigating Measures	Measures to reduce or avoid environmental damage.
Parts per Million (ppm)	A mixing ratio by volume. It expresses the concentration of a pollutant or the ratio of its volume if segregated pure, to the volume of polluted air in which it is contained.
Species Protected by Statute	Species with special protection under the terms of the *Wildlife and Countryside Act 1981* and *Wildlife and Countryside (Amendments) Act 1985.*
Structure Plans	A Plan setting out a County Planning Authority's strategic policies and general proposals for the development and use of land throughout the county.
Visual Envelope	Outlines the area of land from which there is a view of any part of the proposed road, its structures, or the traffic which would use it.
Visual Intrusion	The extent to which the development effects upon the existing landscape dependant upon the quality and type of landscape through which it runs. The degree of effect is assessed in a qualitative "before and after" comparison in a subjective manner by the landscape architect. An opinion is formed as to how, from a series of view points, the landscape would be affected by the new development.
Watching Brief	A qualified archaeologist watches over the soil stripping and construction activities to check for any archaeological remains that may be uncovered.

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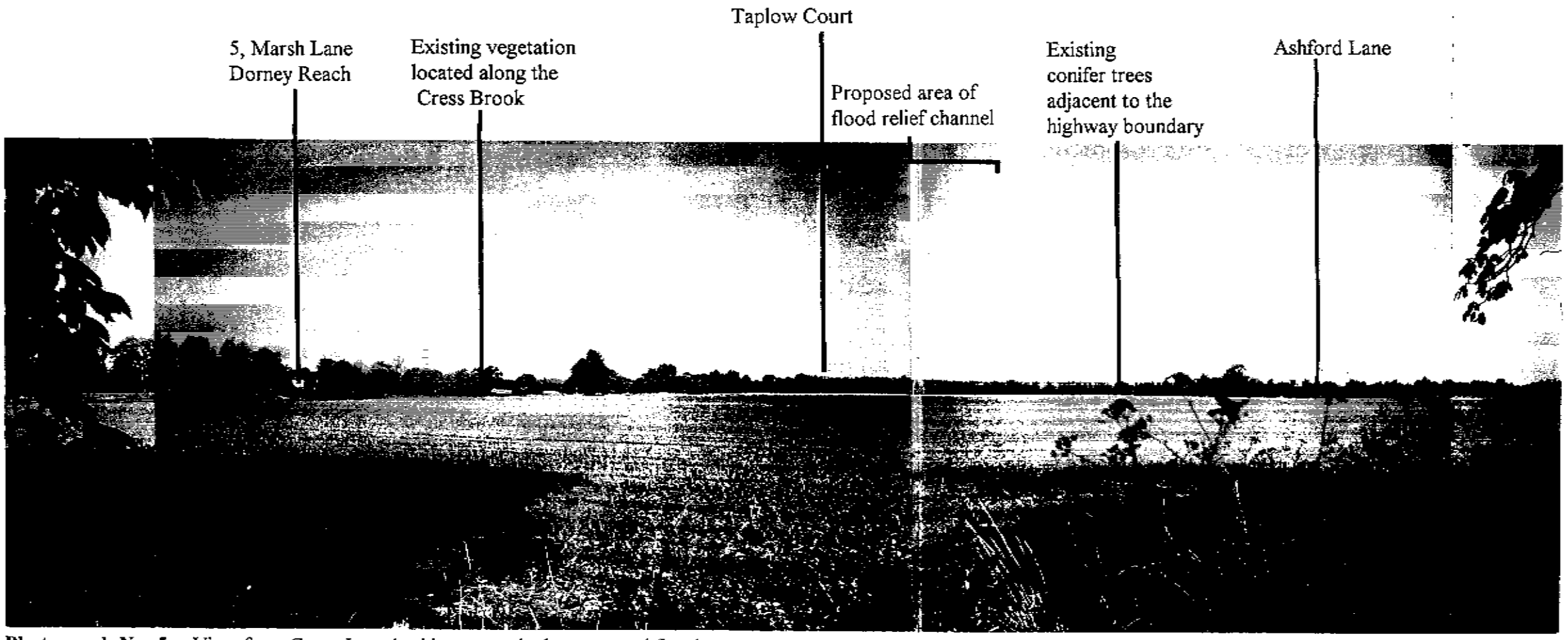
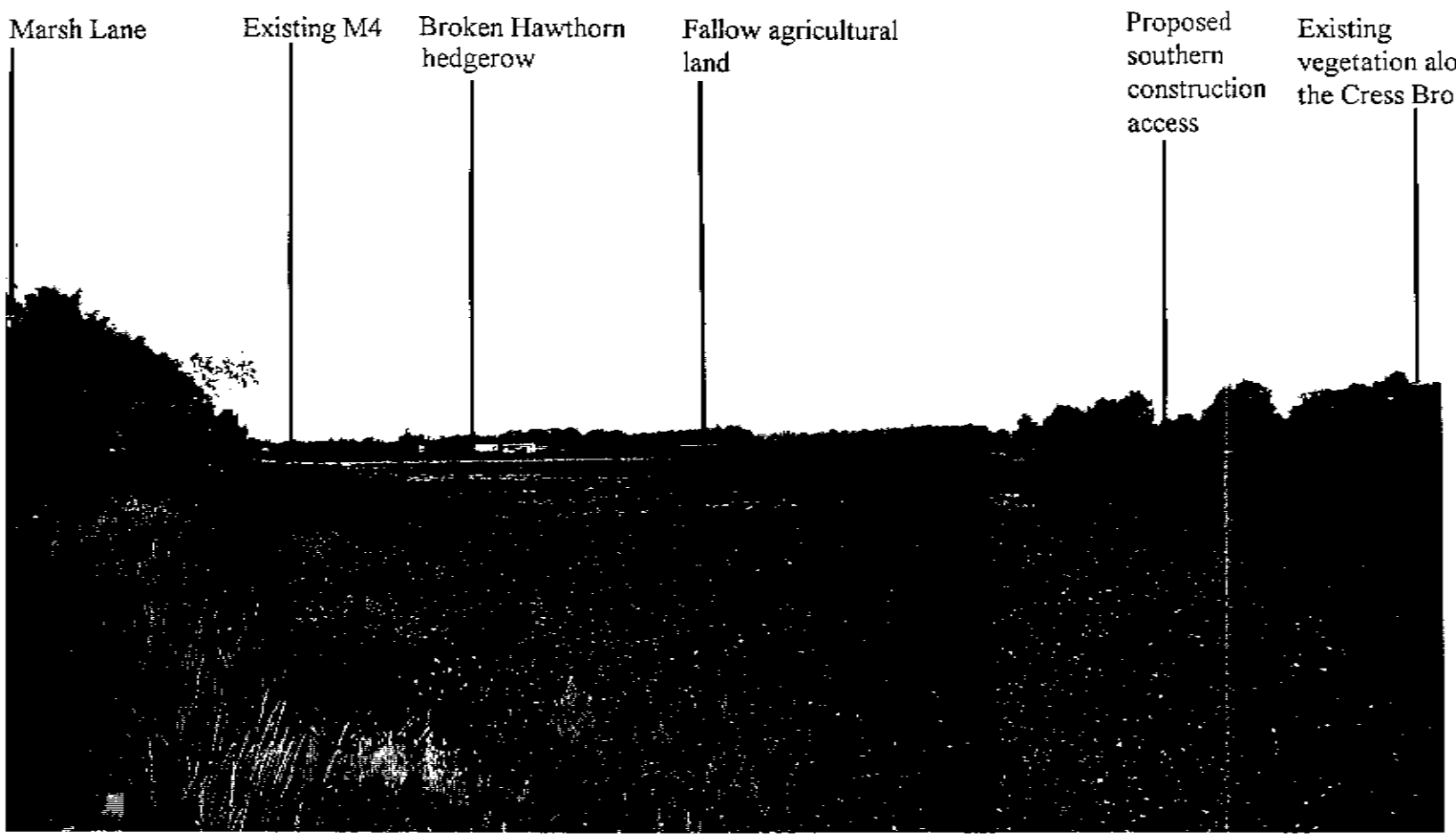
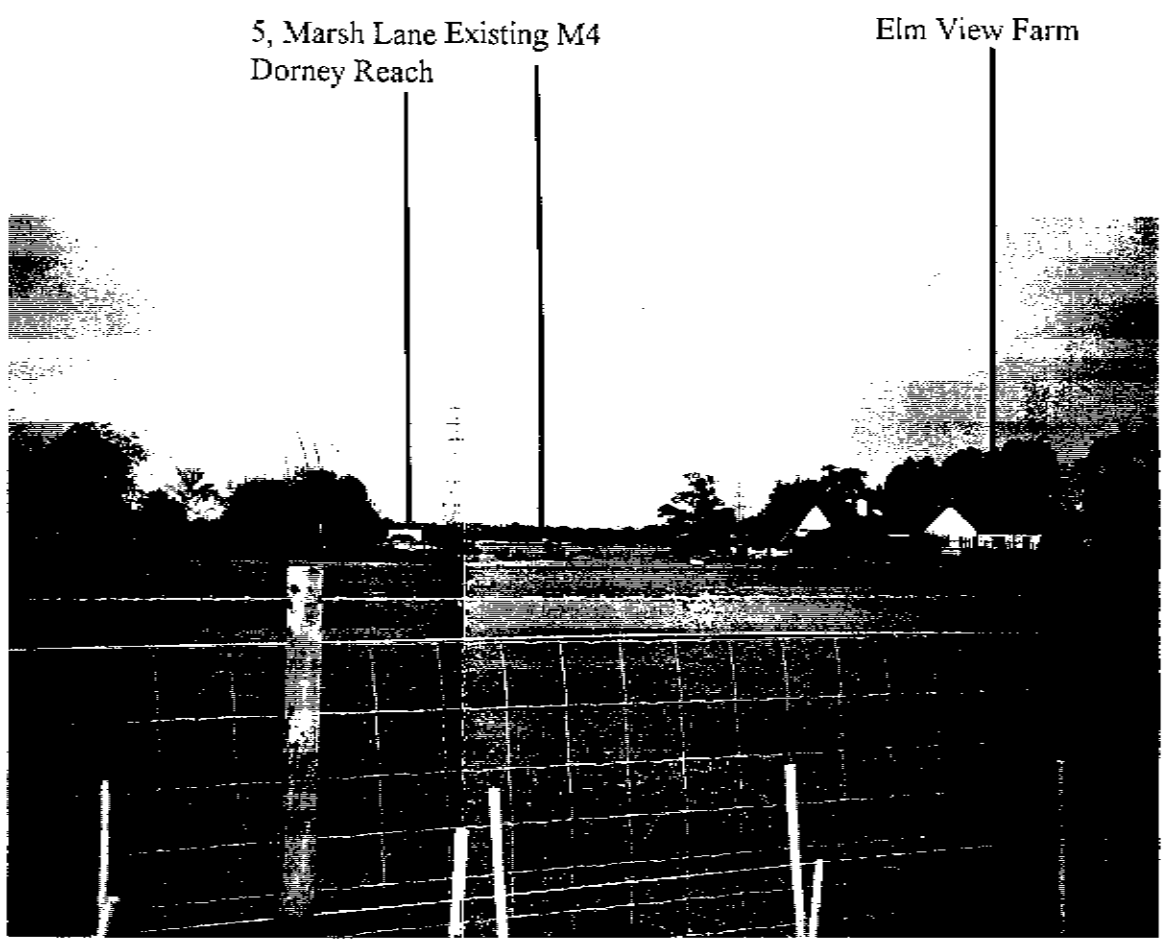
FIGURES



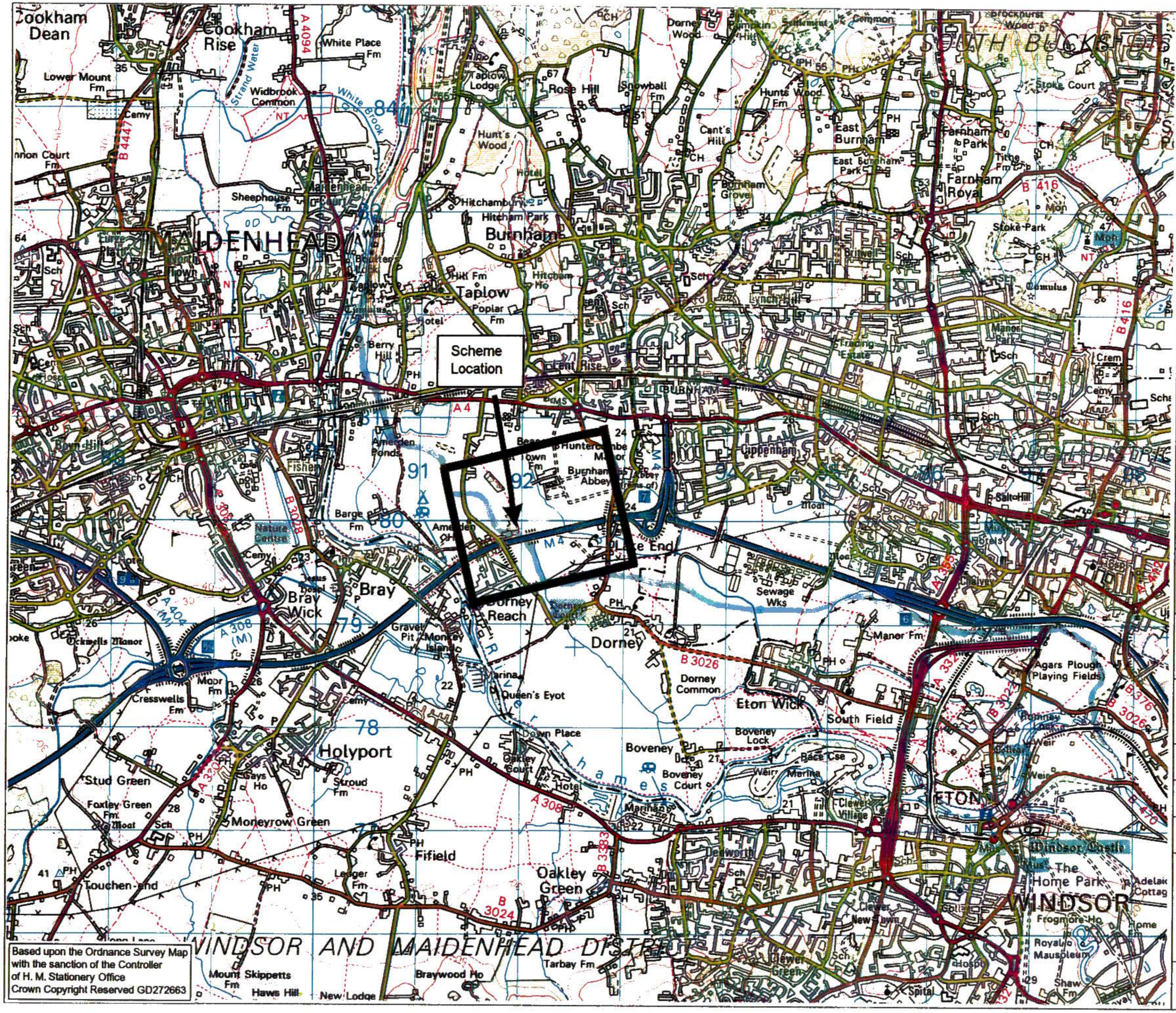
Photograph No. 5 - View from Court Lane looking towards the proposed flood relief channel.



Photograph No. 6. - View northwards towards the M4 from the public footpath located opposite properties at Dorney Reach on Marsh Lane.



Photograph No. 7 - View from the public bridleway located to the west of Court Lane looking northwards towards Dorney Reach and the M4.



KEY

STUDY AREA

ROUTE OF PROPOSED FLOOD RELIEF CHANNEL

DOCUMENT NO
DOT0202-004-D2-4

CLIENT
HIGHWAYS AGENCY
An Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
SCHEME LOCATION

SCALE		
1:50 000		
DATE NOV 1995	DRAWN AA	REV NO 2

FIGURE 1.1

acer ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
TELEPHONE 0117 9881881
FAX 0117 9881661

ACER ENVIRONMENTAL IS A DIVISION OF ACER CONSULTANTS LTD

YE MEADS

WEST TOWN FARM

LAKE END ROAD

MARSH LANE

ROUNDMOOR DITCH

LAKE END

PROPOSED M4 UNDERBRIDGE

LOT'S HOLE

LAKE END FARM

TEMPORARY STREAM CROSSING

ASHFORD LANE

CRESS BROOK

DORNEY REACH

N

KEY

- PROPOSED FLOOD RELIEF CHANNEL
- MWEFAS CPO BOUNDARY
- CONSTRUCTION ACCESS *
- TEMPORARY MOTORWAY DIVERSION
- POSSIBLE LOCATION * OF SITE COMPOUND
- POSSIBLE LOCATION OF BORROW PIT FOR TEMPORARY EMBANKMENT FILL MATERIAL *
- POSSIBLE SOIL STOCKPILE * (2 METRES HIGH MAX.)

* THESE ITEMS WERE INDICATED IN THE PLANNING APPLICATION FOR THE MAIDENHEAD WINDSOR AND ETON FLOOD ALLEVIATION SCHEME

DOCUMENT NO
DOT0202-004-D2-4

CLIENT
HIGHWAYS AGENCY
Motorway Operations Division
An Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
PROPOSED SCHEME & CONSTRUCTION DETAILS

SCALE
1:5000

DATE	DRAWN	REV NO
DEC 1995		2

FIGURE 4.1

acer ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
TELEPHONE 0117 9881881 FAX 0117 9881661

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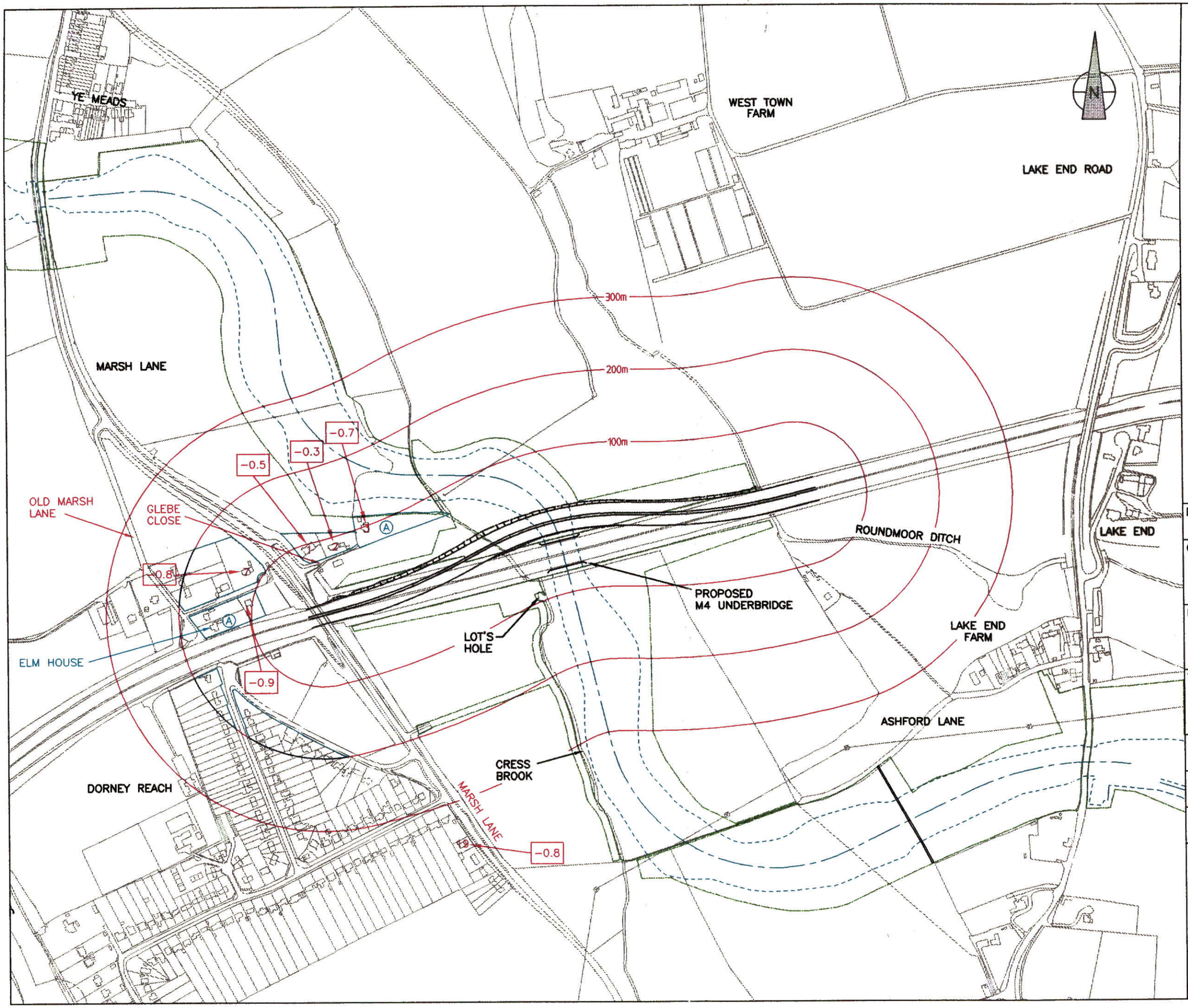


KEY

- MWEFAS CPO BOUNDARY
- TEMPORARY DIVERSION
- PROPOSED FLOOD RELIEF CHANNEL
- Ⓐ RECEPTOR USED IN AIR QUALITY ASSESSMENT
- AREAS SENSITIVE TO CHANGES IN AIR QUALITY
- 2 HOUSE NUMBER/ADDRESS OF PROPERTY INCLUDED IN NOISE CALCULATION TABLES
- 100m , 200m & 300m ASSESSMENT BANDS
- -0.5 CHANGE IN TRAFFIC NOISE (dBL_{A10}) DUE TO DIVERSION COMPARED WITH EXISTING SITUATION (MAX. FOR PROPERTY)

DOCUMENT NO
DOT0202-004-D2-4

CLIENT
HIGHWAYS AGENCY
Motorway Operations Division
An Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
AIR QUALITY AND TRAFFIC NOISE

SCALE
1:5000

DATE	DRAWN	REV NO
OCT 1995	RN	

FIGURE 5.1

ACER ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
TELEPHONE 0117 9881881 FAX 0117 9881661

ACER ENVIRONMENTAL IS A DIVISION OF ACER CONSULTANTS LTD

WEST TOWN FARM

LAKE END ROAD

MARSH LANE

FP18

FP21

FP23

FP22

BW19

DORNEY REACH

ASHFORD LANE

BW5

FP5

FP1

1 WINTER BARLEY
2 GRASS LEY
3 VEGETABLES
4 FALLOW FOLLOWING VEGETABLES
5 VEGETABLES
6 VEGETABLES
7 VEGETABLES
8 WINTER BARLEY

NB: LANDUSE/CROPPING INFORMATION SUPPLIED BY MAFF ON 03/08/95.

KEY

- RESIDENTIAL
- WATERBODY
- ROUGH GROUND
- AGRICULTURE/ MARKET GARDENING
- WOODLAND / TREE BELT
- SCHOOL (DORNEY COUNTY PRIMARY)
- RECREATION GROUND (TRUMPERS FIELD)
- VILLAGE HALL (DORNEY)
- KENNELS
- PUBLIC FOOTPATH (FP)
- PUBLIC BRIDLEWAY (BW)
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION
- SITE OF LOCAL ARCHAEOLOGIAL INTEREST (BUCKS PRN 2114 – LOT'S HOLE)
- CONSERVATION AREA (HUNTERCOMBE)

DOCUMENT NO
DOT0202–004–D2–4

CLIENT
HIGHWAYS AGENCY
Motorway Operations Division
An Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

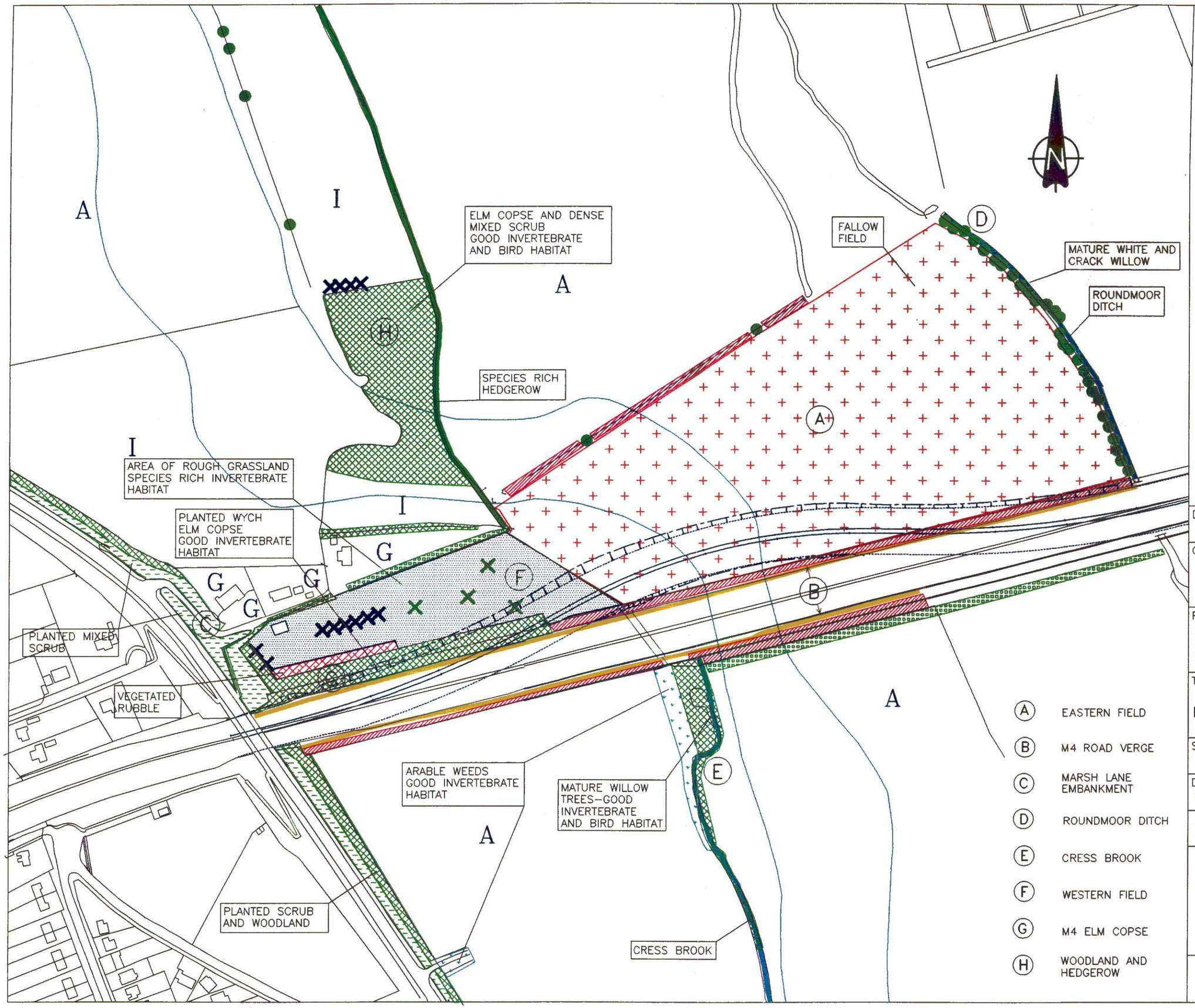
TITLE
Cultural Heritage, Land Use Rights of Way and Community Facilities

SCALE
1:5000

DATE	DRAWN	REV NO
DEC 1995	AA	4

FIGURE 6.1

acer ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
TELEPHONE 0117 9881881
FAX 0117 9881661



KEY

- DECIDUOUS WOODLAND
- DENSE PLANTED SCRUB
- SPECIES POOR HEDGEROW /MOTORWAY PLANTING
- CONIFERS AND GARDEN TREES
- SPECIES RICH INVERTEBRATE HABITAT
- ARABLE WEEDS
- SPECIES RICH HEDGEROW
- FALLOW FIELD
- SPECIES POOR MOTORWAY VERGE
- VEGETATED RUBBLE
- BRAMBLE SCRUB
- SCATTERED SCRUB
- INDIVIDUAL TREES
- A ARABLE
- G GARDEN
- I IMPROVED GRASSLAND
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION

DOCUMENT NO
DOT0202-004-D2-4

CLIENT
HIGHWAYS AGENCY
Motorway Operations Division
An Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
Habitat Survey

SCALE
1:2500

DATE	DRAWN	REV NO
NOV 1995	AA	

FIGURE 8.1

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KEY

- WOODLAND
- HEDGEROW / TREEBELT
- CONSTRUCTION ACCESS
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION

DOCUMENT NO
DOT0202-004-D2-4

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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
EXISTING VEGETATION

SCALE
1:10 000

DATE	DRAWN	REV NO
NOV 1995	AA	1

FIGURE 9.1

ACER ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
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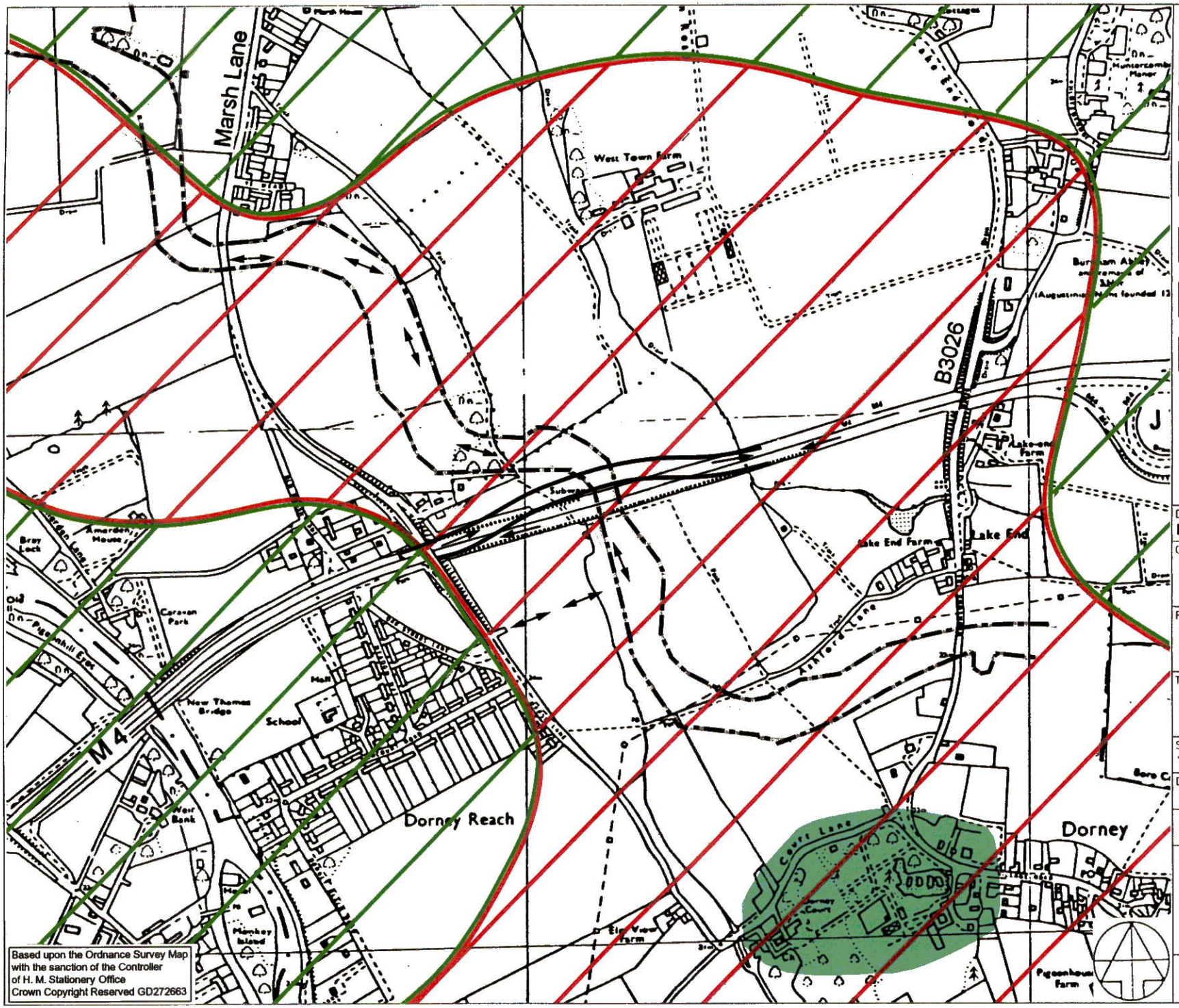
FAX 0117 9881661



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KEY

- URBAN FRINGE LANDSCAPE
- SUBURBAN RURAL LANDSCAPE
- LOCALISED AREA OF ATTRACTIVE LANDSCAPE
- CONSTRUCTION ACCESS
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION

DOCUMENT NO
DOT0202-004-D2-4

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Executive Agency of THE DEPARTMENT OF TRANSPORT

PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

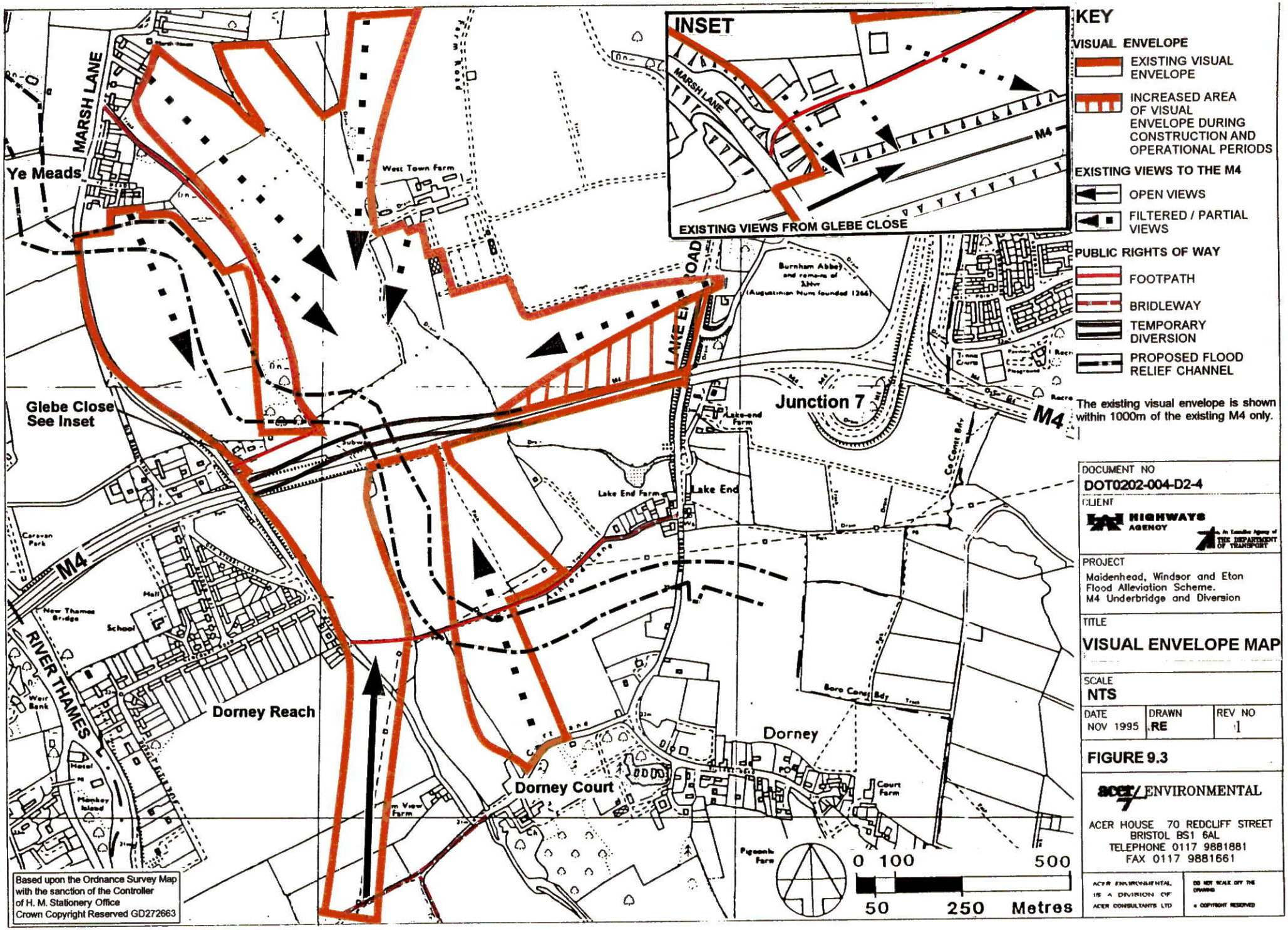
TITLE
LANDSCAPE CHARACTER

SCALE
1:10 000

DATE	DRAWN	REV NO
NOV 1995	AA	I

FIGURE 9.2

ACER ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
TELEPHONE 0117 9881881
FAX 0117 9881661


INSET
MARSH LANE
M4
EXISTING VIEWS FROM GLEBE CLOSE
KEY
VISUAL ENVELOPE
EXISTING VISUAL ENVELOPE
INCREASED AREA OF VISUAL ENVELOPE DURING CONSTRUCTION AND OPERATIONAL PERIODS
EXISTING VIEWS TO THE M4
OPEN VIEWS
FILTERED / PARTIAL VIEWS
PUBLIC RIGHTS OF WAY
FOOTPATH
BRIDLEWAY
TEMPORARY DIVERSION
PROPOSED FLOOD RELIEF CHANNEL
The existing visual envelope is shown within 1000m of the existing M4 only.
Ye Meads
MARSH LANE
West Town Farm
Glebe Close See Inset
Junction 7
M4
Burnham Abbey and remains of Church (Augustinian Nunn founded 1266)
Lake End Farm
Lake End
Caravan Park
M4
New Thames Bridge
School
RIVER THAMES
Dorney Reach
Dorney Court
Dorney
Court Farm
Pigeonk Farm
0 100 500
50 250 Metres
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DOCUMENT NO
DOT0202-004-D2-4
CLIENT
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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme. M4 Underbridge and Diversion
TITLE
VISUAL ENVELOPE MAP
SCALE
NTS
DATE
NOV 1995
DRAWN
RE
REV NO
1
FIGURE 9.3
ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
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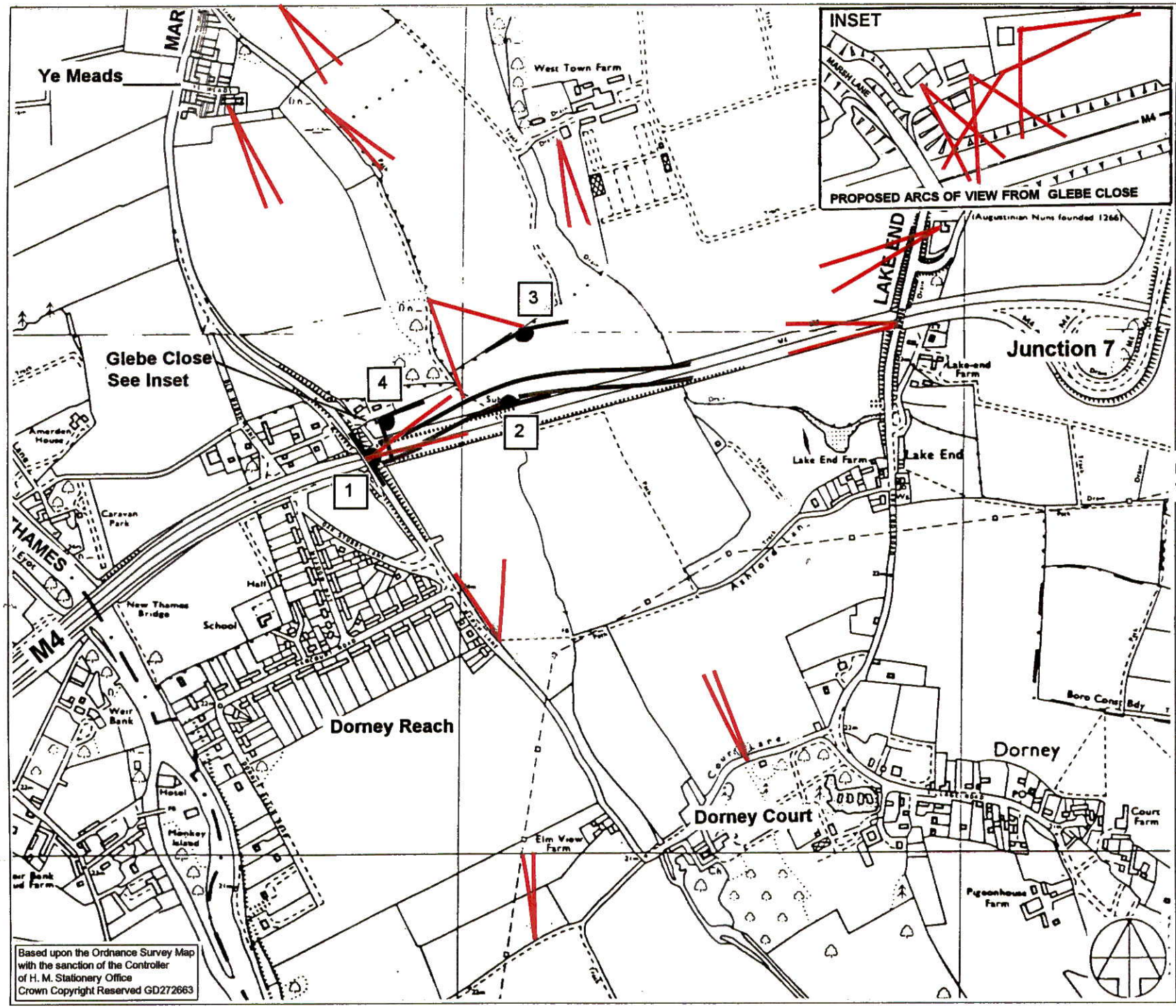

NOTE : Arcs of view are from viewpoints shown on Figure 9.5.

DOCUMENT NO
DOT0202-004-D2-4

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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
PHOTOGRAPH LOCATION PLAN AND ARCS OF VIEW FROM VIEWPOINTS

SCALE
1:10 000

DATE	DRAWN	REV NO
NOV 1995	RE	2

FIGURE 9.4

ACER ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
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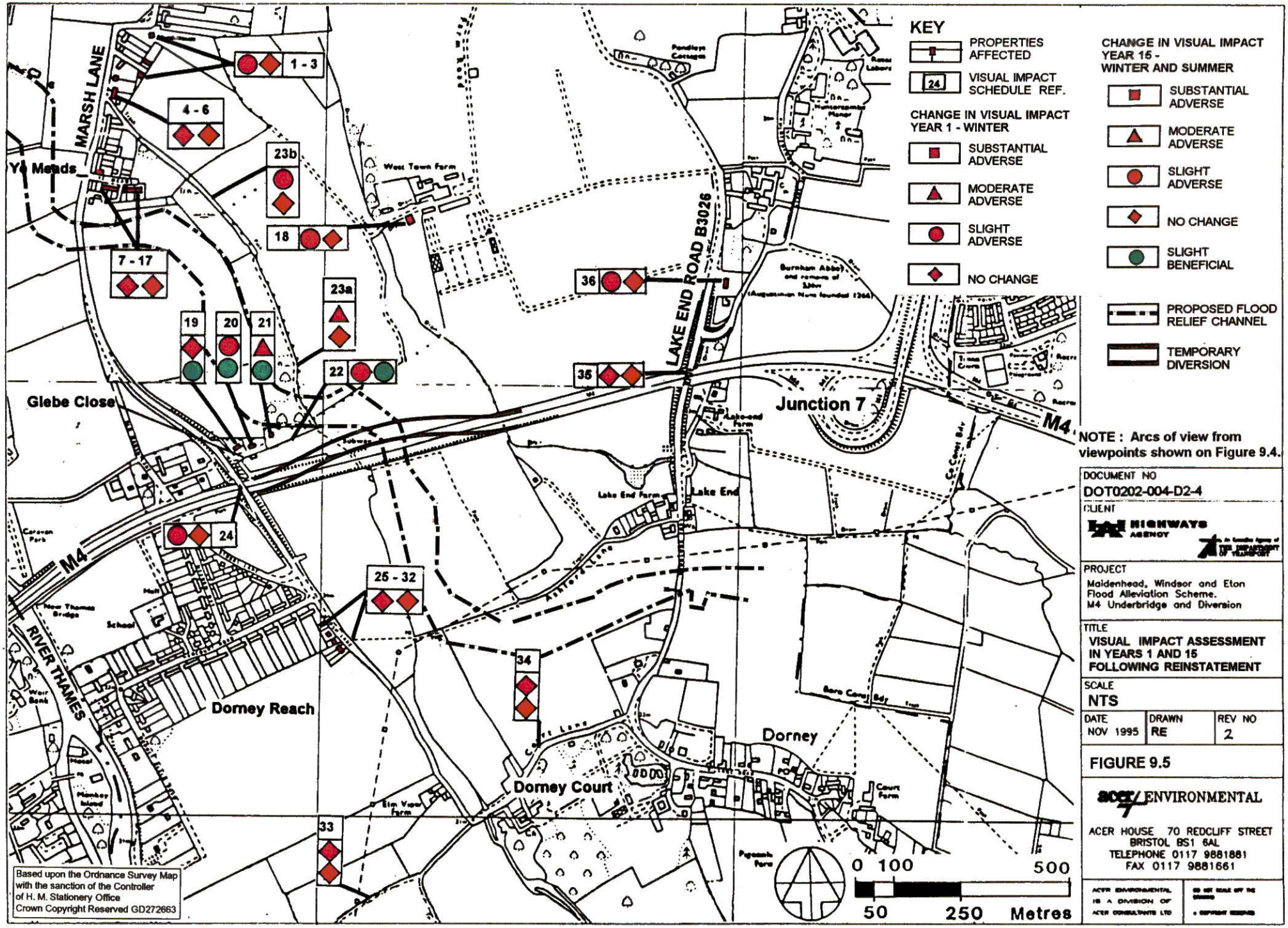
FAX 0117 9881661


KEY
PROPERTIES AFFECTED
VISUAL IMPACT SCHEDULE REF.
CHANGE IN VISUAL IMPACT YEAR 1 - WINTER
SUBSTANTIAL ADVERSE
MODERATE ADVERSE
SLIGHT ADVERSE
NO CHANGE
CHANGE IN VISUAL IMPACT YEAR 15 - WINTER AND SUMMER
SUBSTANTIAL ADVERSE
MODERATE ADVERSE
SLIGHT ADVERSE
NO CHANGE
SLIGHT BENEFICIAL
PROPOSED FLOOD RELIEF CHANNEL
TEMPORARY DIVERSION
MARSH LANE
Ye Meads
Glebe Close
LAKE END ROAD B3026
Junction 7
M4
RIVER THAMES
Dorney Reach
Dorney
Dorney Court
West Town Farm
Lake End Farm
Lake End
Elm View Farm
Court Farm
1 - 3
4 - 6
7 - 17
18
19
20
21
22
23a
23b
24
25 - 32
33
34
35
36
0 100 500
50 250 Metres
NOTE : Arcs of view from viewpoints shown on Figure 9.4.
DOCUMENT NO
DOT0202-004-D2-4
CLIENT
HIGHWAYS AGENCY
PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion
TITLE
VISUAL IMPACT ASSESSMENT IN YEARS 1 AND 15 FOLLOWING REINSTATEMENT
SCALE
NTS
DATE
NOV 1995
DRAWN
RE
REV NO
2
FIGURE 9.5
ACER ENVIRONMENTAL
ACER HOUSE 70 REDCLIFF STREET
BRISTOL BS1 6AL
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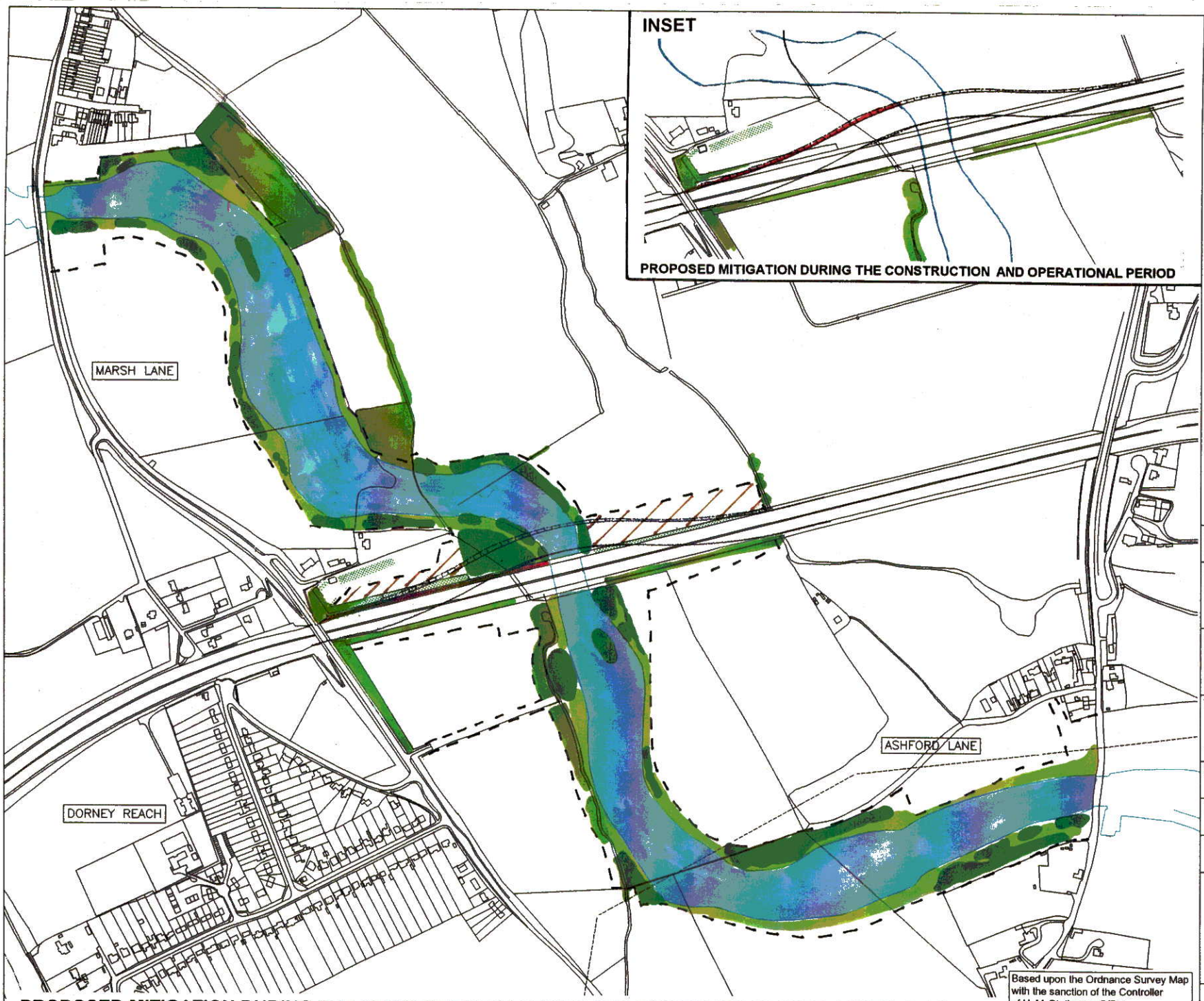

KEY

- EXISTING TREES TO BE RETAINED AND PROTECTED
- PROPOSED TREE AND SHRUB PLANTING
- PROPOSED VISUAL BARRIER - 2.0m HIGH
- TEMPORARY DIVERSION

MWEFAS PROPOSALS

- PROPOSED TREE AND SHRUB PLANTING
- PROPOSED WILDFLOWER/ GRASSLAND
- AGRICULTURAL LAND TO BE REINSTATED FOLLOWING MWEFAS PROPOSALS
- PROPOSED FLOOD RELIEF CHANNEL

DOCUMENT NO
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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
PROPOSED LANDSCAPE MITIGATION AND REINSTATEMENT WORKS

SCALE
1:5000

DATE	DRAWN	REV NO
NOV 1995	AA	2

FIGURE 9.6

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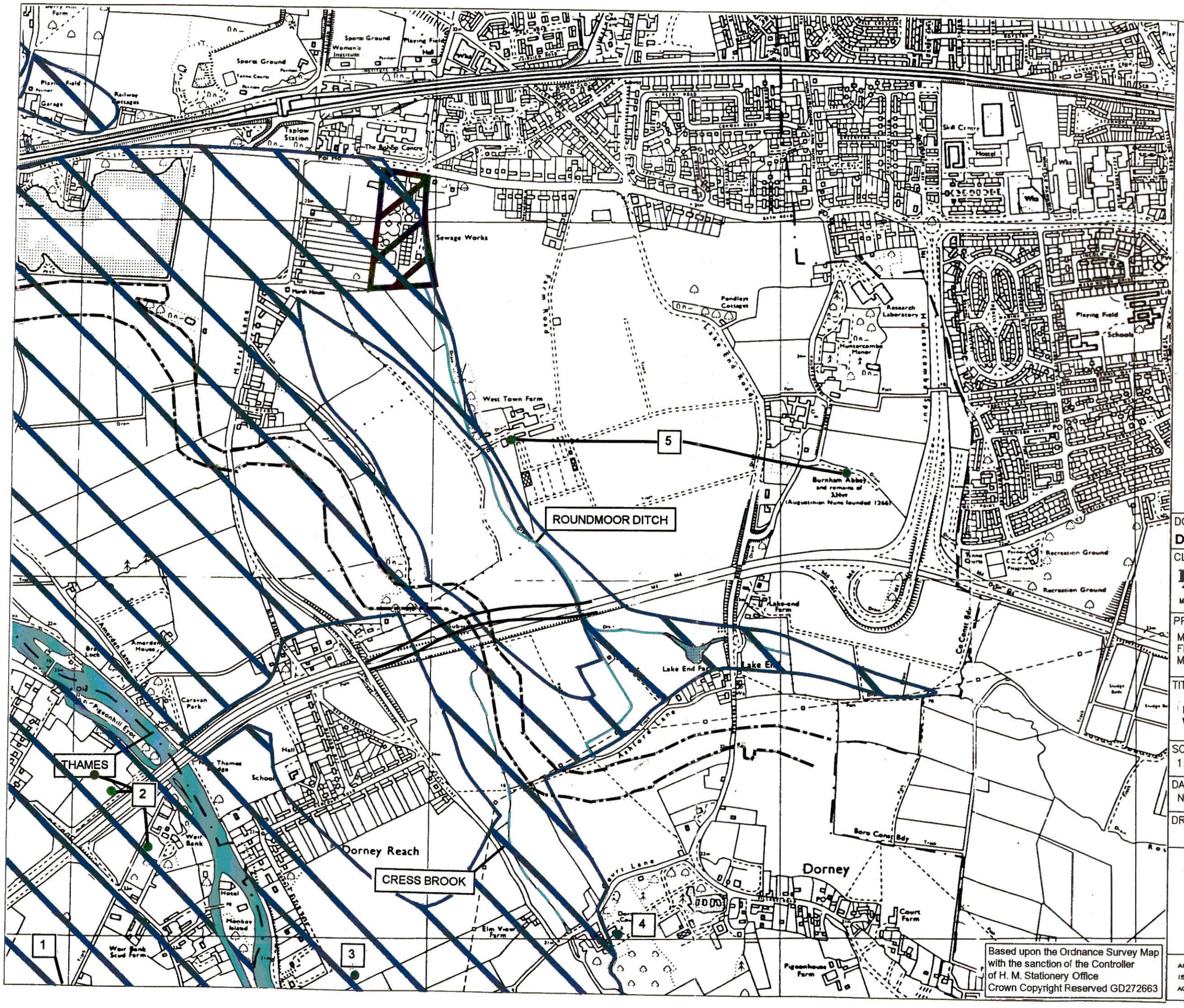
PROPOSED MITIGATION DURING THE REINSTATEMENT PERIOD AND FOR THE PROPOSED MWEFAS SCHEME



KEY

- WATERCOURSES
- WATERCOURSE WITH INTERMITTENT FLOW
- SEWAGE TREATMENT WORKS
- AREA LIABLE TO FLOOD
- LOCATION OF BOREHOLE
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION

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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
FEATURES SIGNIFICANT TO WATER QUALITY & DRAINAGE

SCALE
1:10000

DATE	DRAWN	REV NO
NOV 1995	FD	1

DRAWING NO
14.1

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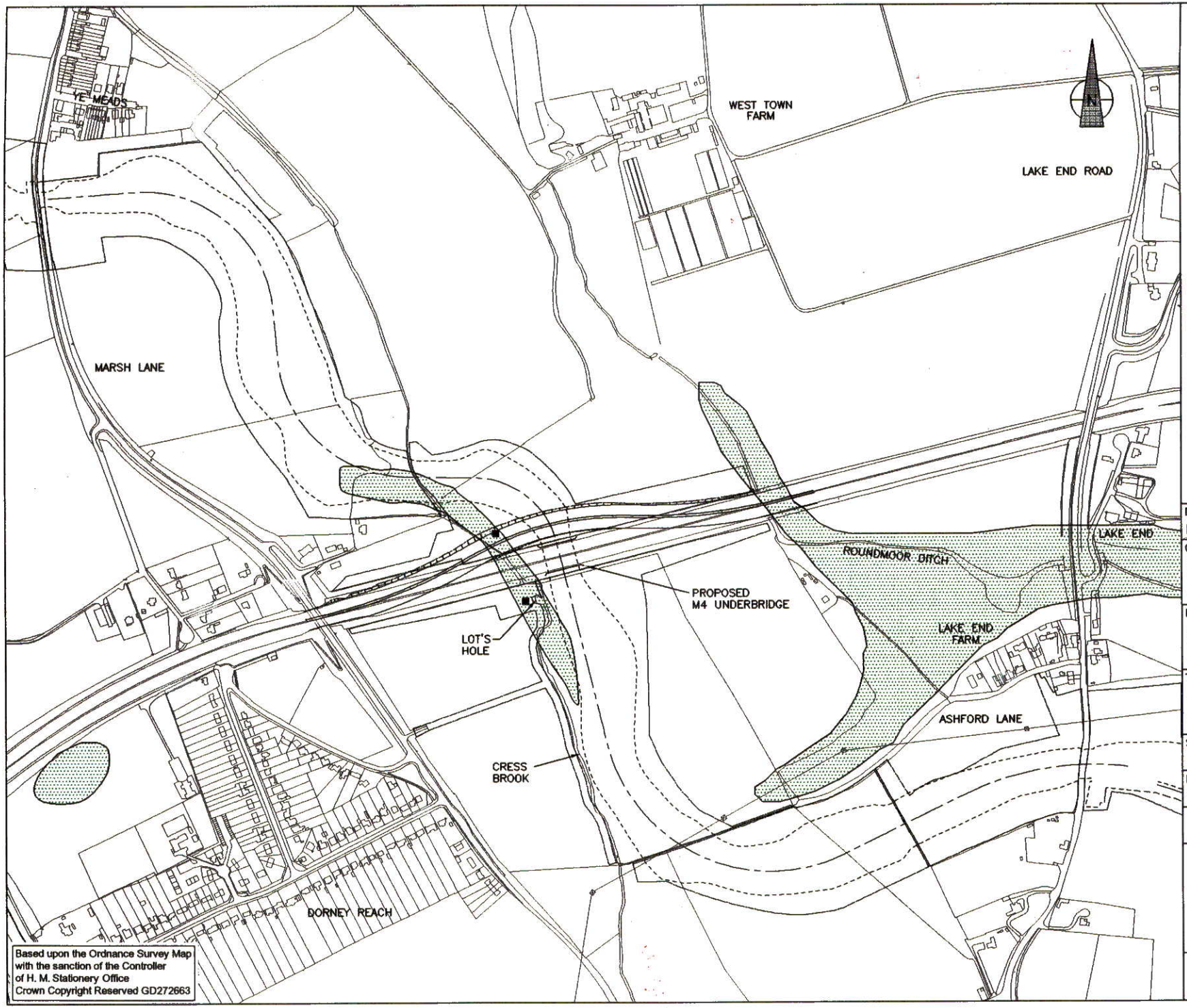

KEY

- MWEFAS CPO BOUNDARY
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY MOTORWAY DIVERSION
- ALLUVIUM
- FLOOD PLAIN GRAVEL
- APPROXIMATE LOCATION OF PEAT-FILLED CHANNEL EXPOSED DURING ARCHAEOLOGICAL SURVEY

NOTES

1. THE STUDY AREA IS UNDERLAIN BY READING BEDS

DOCUMENT NO
DOT0202-004-D2-4

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Motorway Operations Division
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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
GEOLOGICAL PLAN
SOLID & DRIFT

SCALE

DATE	DRAWN	REV NO
OCT 1995		1

FIGURE 15.1

acer/ENVIRONMENTAL
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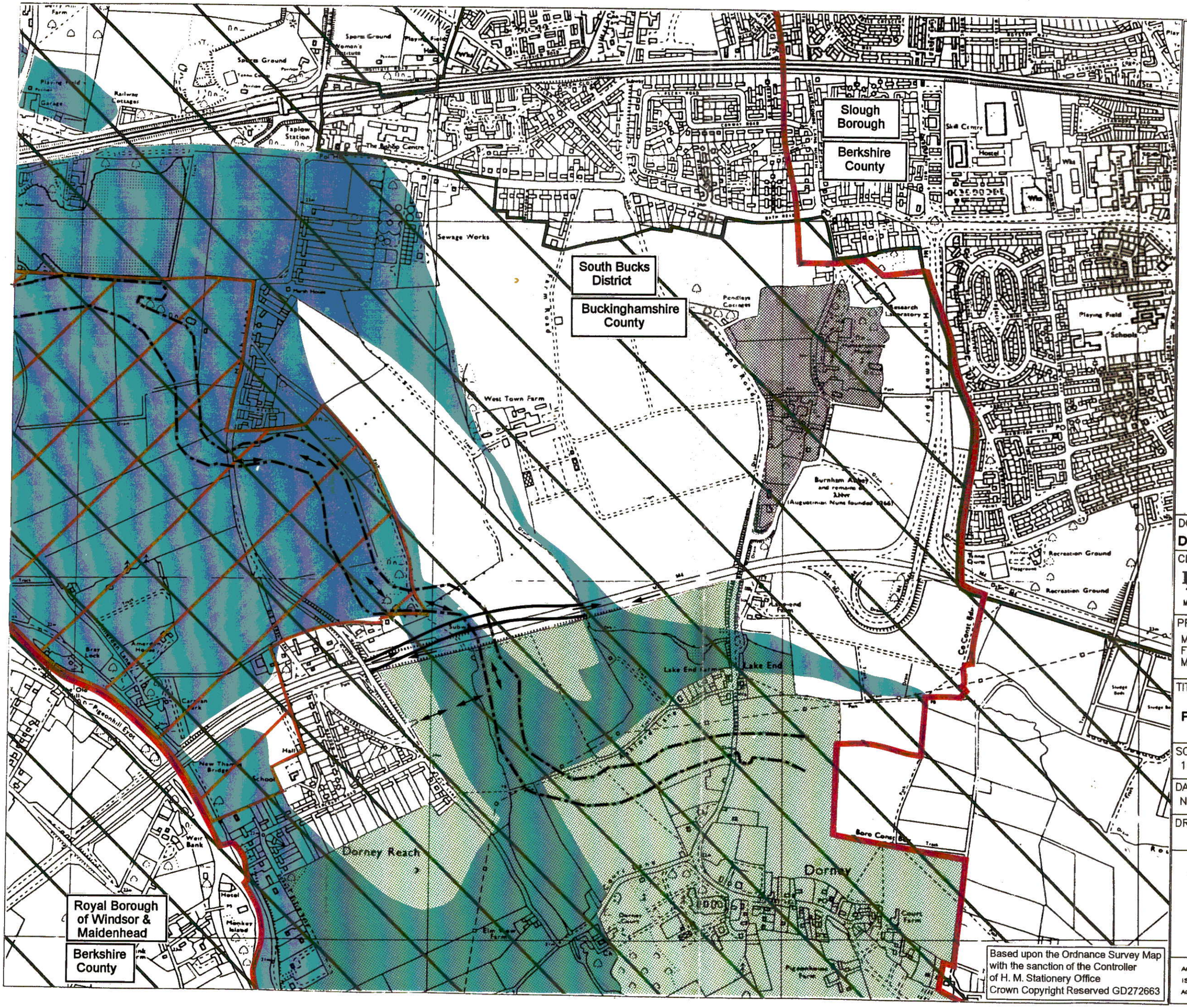

KEY

- AREA LIABLE TO FLOOD
- GREEN BELT
- LOCAL LANDSCAPE AREA
- AREA OF ATTRACTIVE LANDSCAPE
- DISTRICT BOUNDARY
- CONSERVATION AREA
- CONSTRUCTION ACCESS
- PROPOSED FLOOD RELIEF CHANNEL
- TEMPORARY DIVERSION

DOCUMENT NO
DOT0202-004-D2-4

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PROJECT
Maidenhead, Windsor and Eton Flood Alleviation Scheme.
M4 Underbridge and Diversion

TITLE
PLANNING DESIGNATIONS

SCALE
1:10000

DATE	DRAWN	REV NO
NOV 1995	FD	1

DRAWING NO
16.1

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Summary of key environmental effects

The following is a summary of the key environmental effects resulting from the scheme, taking into account measures to minimise them:

- Loss of vegetation would result in moderate visual impact to properties north of the diversion. The effect would be minimised by an environmental barrier in the short term and new planting to replace any lost vegetation in the longer term.
- The archaeological site would be investigated as part of the flood relief channel scheme. The overall effect of the motorway diversion would not be significant.
- Loss of vegetation alongside the existing motorway which supports a protected species, would be of moderate local significance. Planting is proposed to replace trees lost.
- The scheme would have a temporary effect on land use. This would not be significant and the land would be restored to its current state upon removal of the diversion.

Protecting the Environment

The following measures would be used to protect the environment:

- Retaining the maximum amount of existing tree and shrub planting, keeping habitat loss to a minimum.
- Careful site management to minimise effects of dust and noise.
- Providing environmental barriers to mitigate visual effects until planting becomes established.
- Planting of trees to replace those taken by the works.

Your comments

If you have any comments please write, not later than 24 June 1996 to:

Highways Agency
Motorway Operations Division
Broadway
Broad Street
Birmingham
B15 1BL

What happens next?

Your views will be carefully considered and, depending on the nature of any objections received to the draft Orders, a Public Inquiry may be held before an independent inspector. There would then be a decision by the Secretaries of State for the Environment and Transport on whether to proceed with the scheme as proposed.

Detailed information

An environmental assessment of the proposals has been carried out and the findings are set out in an Environmental Statement in accordance with EC Directive 85/337.

Copies of the Environmental Statement, draft Orders and Stage 3 Assessment Report will be deposited for inspection during normal office hours at the following locations:

Highways Agency
Motorway Operations Division
Broadway
Broad Street
Birmingham
B15 1BL

Highways Agency
Room 12/09
St Christopher House
London
SE1 0TE

Buckinghamshire County Council
County Hall
Aylesbury
Buckinghamshire
HP20 1UY

South Bucks District Council
Council Offices
Windsor Road
Slough
SL1 2HN

Environment Agency
Thamesgate House
High Street
Maidenhead
SL6 1PT

Copies of the Environmental Statement and Stage 3 Assessment Report can be purchased from the Highways Agency at the Birmingham address above.

The HIGHWAYS AGENCY is an Executive Agency of the Department of Transport

THE DEPARTMENT OF TRANSPORT

ENVIRONMENTAL EFFECTS

HIGHWAYS AGENCY

TEMPORARY MOTORWAY DIVERSION

M4 MOTORWAY

PROPOSED BRIDGE AND DIVERSION FOR THE MAIDENHEAD WINDSOR AND ETON FLOOD ALLEVIATION SCHEME

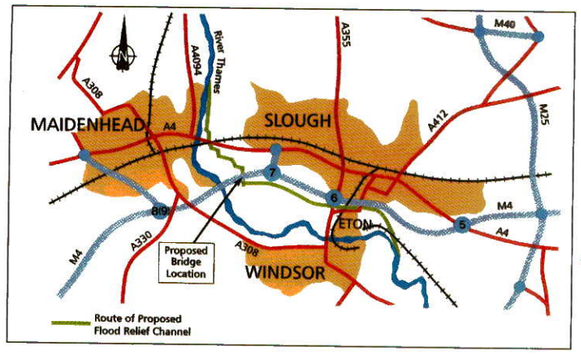
Explanation of the Scheme and Non-Technical Summary of the Environmental Statement

May 1996

ENVIRONMENTAL EFFECTS

The Highways Agency is proposing to construct a new underbridge requiring the temporary diversion of a section of the M4 Motorway between Junctions 7 and 8(9) to the east of Maidenhead.

This brochure explains the proposals and summarises the Environmental Statement in non-technical language.



The Environmental Statement

The Environmental Statement is issued in accordance with EC Directive 85/337 as applied by Section 105A of the Highways Act 1990. It describes the proposals, the main effects on the environment and the measures proposed to minimise any adverse environmental effects. Its purpose is to ensure that the public is given the opportunity to give its views before the work begins.

Why are the works necessary?

The Environment Agency (formerly the National Rivers Authority) has obtained the necessary approvals to construct a new flood relief channel as the principal part of the Maidenhead, Windsor and Eton Flood Alleviation Scheme. The route of the channel will pass underneath the existing M4 motorway to the east of Marsh Lane. A new underbridge is required there to carry the motorway over the flood relief channel. A temporary diversion of the motorway is proposed to create space for the construction of the bridge and to maintain the flow of traffic in both directions.

Alternative diversions

The position of the underbridge is fixed by the route of the flood relief channel. Options for the diversion to pass either to the north or the south of the bridge site have been considered. In October 1992 the Highways Agency published proposals for a diversion to the south. These have been withdrawn in favour of a diversion to the north because the overall environmental effect would be less.

What are the plans?

The motorway would be diverted on to a temporary embankment, maintaining three lanes and a hardshoulder in each direction. Construction of the diversion would take approximately three months to complete. Traffic would then be transferred on to the diversion as shown on the cross-section diagram in the top right hand corner. It would take approximately six months to construct the bridge. When this is complete, traffic would be returned to the existing motorway and the diversion would be removed. The land outside that required for the flood relief channel would be restored and excavation of the flood relief channel could begin.

Environmental setting

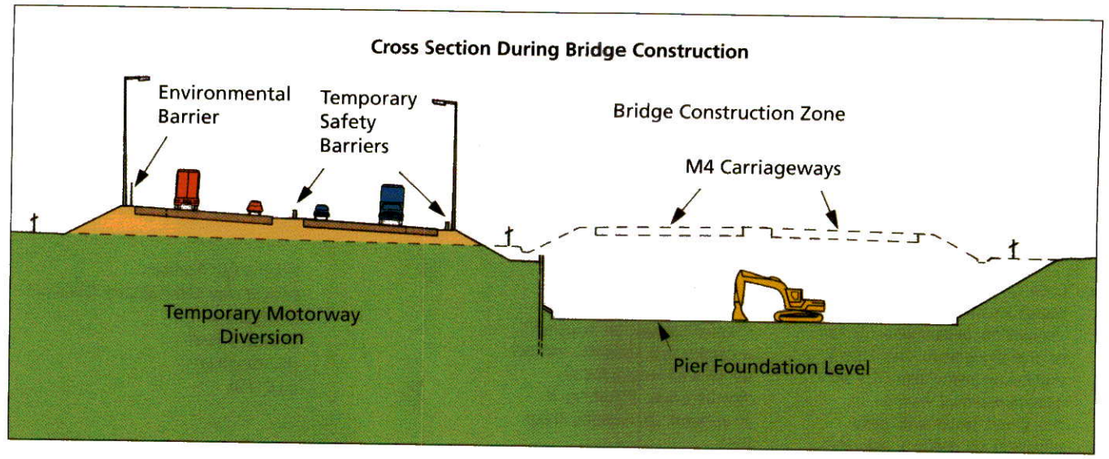
This section of the M4 motorway passes through the Thames valley between Maidenhead and Slough. The land, which is in the Metropolitan Green Belt, is mainly used for agriculture and market gardening, and has an open landscape. There are areas with local landscape designation both to the north and south of the motorway. Proposals and main constraints are shown on the plan below.

Environmental effects

The key environmental issues identified in this project are summarised below:

Landscape and visual intrusion
There would be some loss of vegetation alongside the motorway which would mean that the properties in Glebe Close would no longer be screened from traffic. An environmental barrier would reduce visual intrusion while traffic is using the diversion. This would be moved, following restoration work, to the edge of the existing motorway to reduce visual impact while replacement vegetation becomes established.

Ecology
No Sites of Special Scientific Interest or National Nature Reserves would be affected. Loss of some vegetation would affect the habitat of a protected species. As much of the habitat as possible would be retained. During restoration trees lost would be replaced.



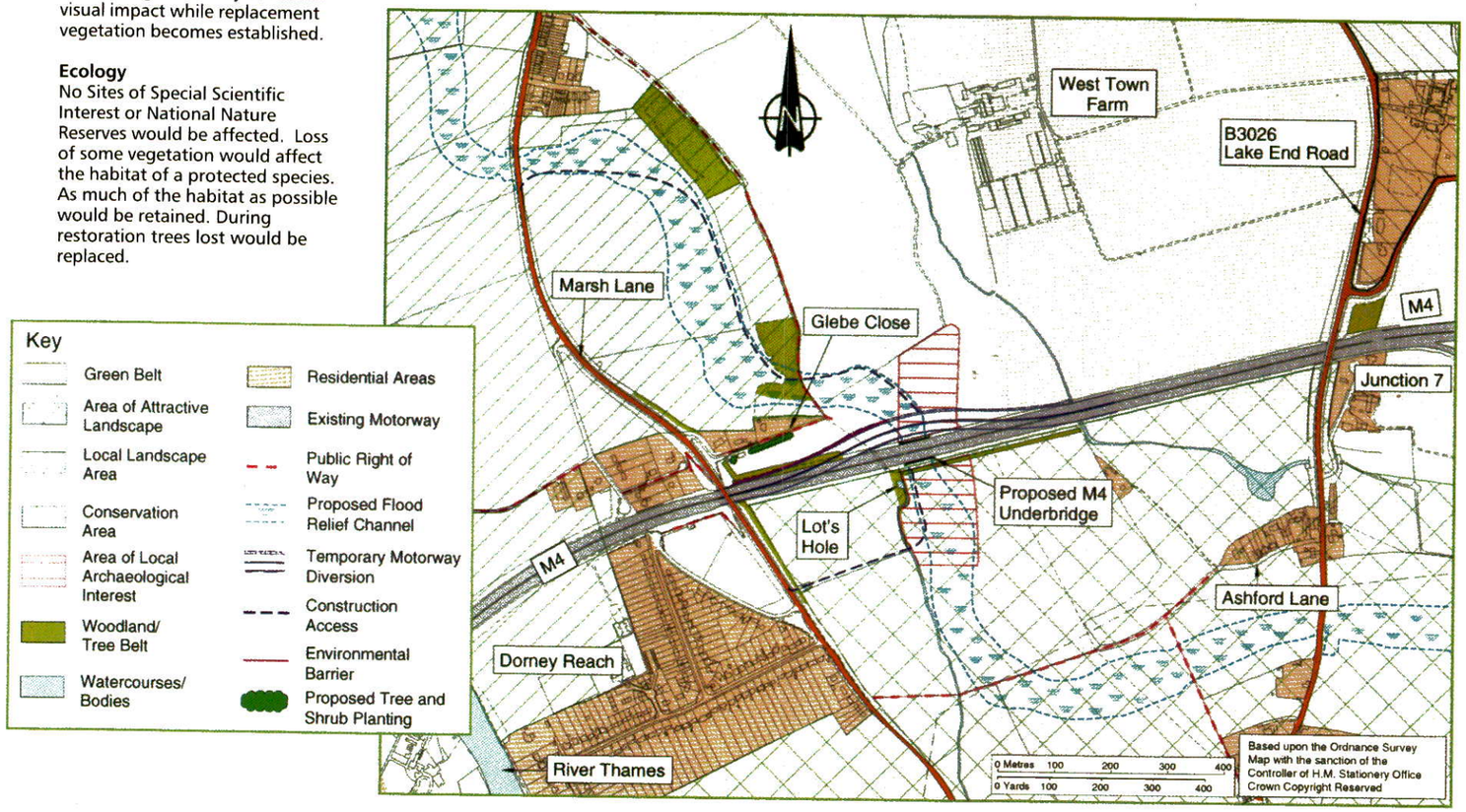
Heritage/archaeology
The diversion passes through an area of archaeological interest known as Lot's Hole site. The flood relief channel also passes through this site and there will be a full archaeological dig before the diversion is constructed. A qualified archaeologist will be present while topsoil is removed.

Footpaths
There would be no change to the public footpath network.

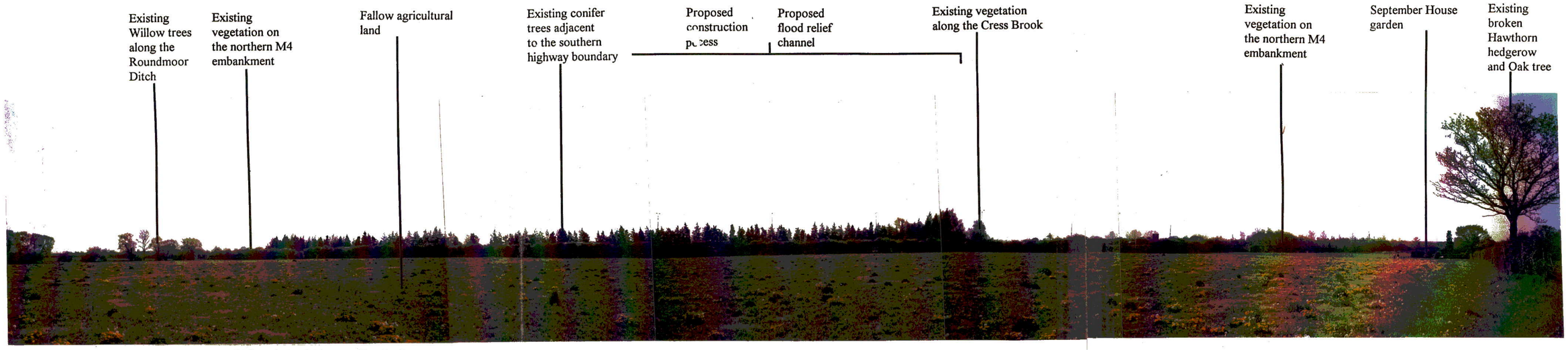
Noise
Temporary disturbance is likely due to construction activities, but careful site management and working practices would reduce noise levels. There would be no significant change in traffic noise levels when the diversion is in use.

Air quality
There would be no significant change in air quality when traffic is using the diversion.

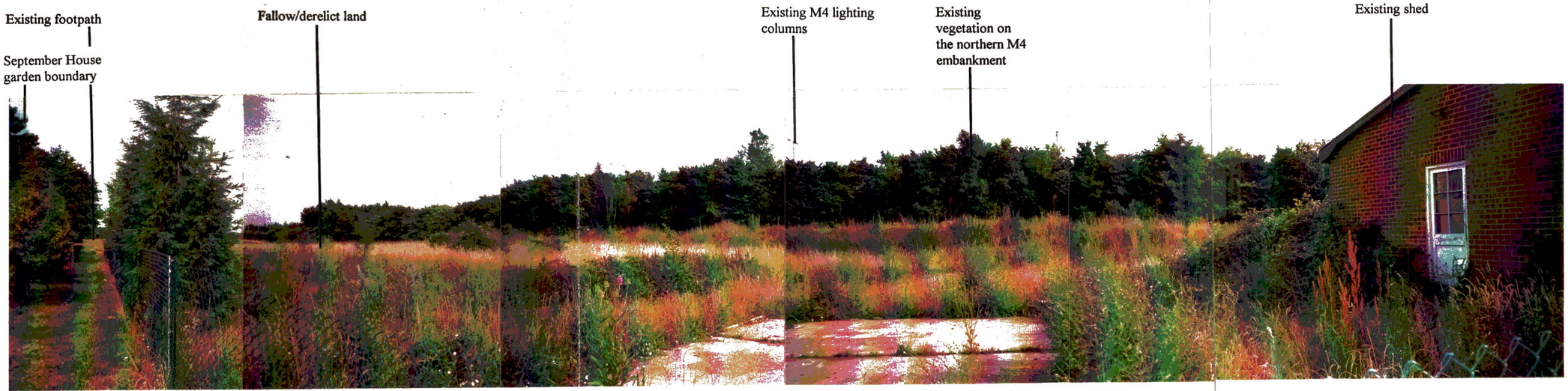
Other
The effect on land use would be temporary and land would be restored to its previous state. During construction of the diversion and the underbridge there would be no direct effect on watercourses, as measures would be used to protect them during both construction and operation.



ENVIRONMENTAL EFFECTS

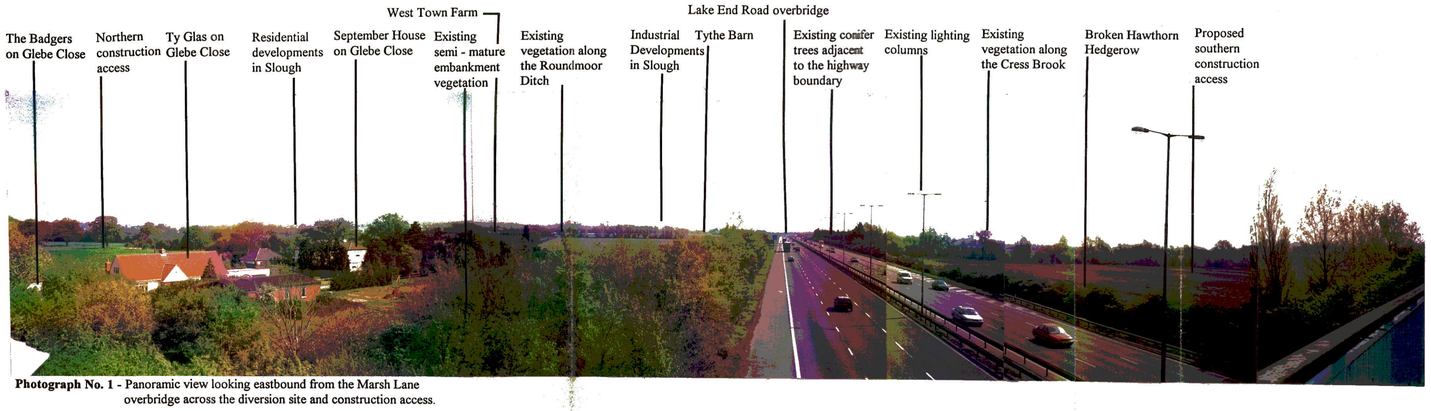


Photograph No. 3 - View southwards towards the existing M4 across the site from the broken Hawthorn hedgerow.

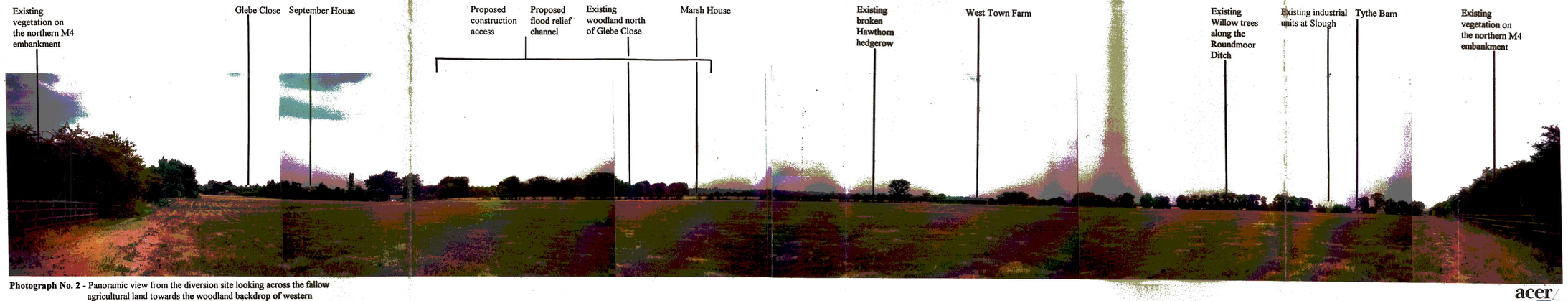


Photograph No. 4 - View from the Glebe Close footpath looking towards the existing M4 embankment.

acer 7



Photograph No. 1 - Panoramic view looking eastbound from the Marsh Lane overbridge across the diversion site and construction access.



Photograph No. 2 - Panoramic view from the diversion site looking across the fallow agricultural land towards the woodland backdrop of western Slough to the north.

acer