



UNCLASSIFIED

TOLLGATE HOUSE

HA 044/027/000155 1

ENVIRONMENT & LANDSCAPE
Environmental Statement

18/03/2001 12:43:26

**A249 IWADE BYPASS TO QUEENBOROUGH
IMPROVEMENT – ADDENDUM TO
ENVIRONMENTAL STATEMENT 08/99**



HA 44/27/155# 1

A249 Iwade Bypass to Queenborough Improvement Addendum to Environmental Statement

August 1999

Mott MacDonald
Demeter House
Station Road
Cambridge CB1 2RS
Tel 01223 463500
Fax 01223 461007

A249 Iwade Bypass to Queenborough Improvement Addendum to Environmental Statement

Issue and Revision Record

Rev	Date	Originator (Print) (Signature)	Checker (Print) (Signature)	Approver (Print) (Signature)	Description
A	July 1999	I Hesling-Gibson	J Purseglove	D Moore	First Issue
B	July 1999	I Hesling-Gibson	J Purseglove	D Moore	Second Issue
C	August 1999	I Hesling-Gibson	J Purseglove	D Moore	Final Issue

This document has been prepared for the titled project or named part thereof and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authority of Mott MacDonald being obtained. Mott MacDonald accepts no responsibility or liability for the consequences of this document being used for a purpose other than the purposes for which it was commissioned. Any person using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm his agreement to indemnify Mott MacDonald for all loss or damage resulting therefrom. Mott MacDonald accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned.

List of Contents

Chapters and Appendices

1	Introduction	1
2	Corrections to the Original Environmental Statement	1
3	Updates to Subject Areas	2
3.1	Air Quality	2
3.1.1	Introduction	2
3.1.2	Existing Baseline Air Quality Conditions	2
3.1.3	Predicted Impacts and Effects of the Scheme	5
3.1.4	Conclusions	10
3.2	Ecology and Nature Conservation	11
3.2.1	Biodiversity Action Plans: General Introduction	11
3.2.2	Methodology and sources	12
3.2.3	Measures to address possible effects on Key Habitats	13
3.2.4	Measures to address possible effects on Priority Species	16
3.2.5	Effects On UK and Kent Biodiversity Species Of Conservation Concern	19
3.3	Land Use and Agriculture	20
3.3.1	General Introduction	20
3.3.2	Revised Assessment	20
3.3.3	Conclusion	20
3.4	Traffic Noise and Vibration	20
3.4.1	General Introduction	20
3.4.2	Revised Impact Assumptions	21
3.4.3	Results of the Revised Traffic Noise Predictions	21
3.4.4	Conclusions	23
3.5	Pedestrians, Cyclists, Equestrians and Community Effects	32
3.5.1	General Introduction	32
3.5.2	Pedestrians	32
3.5.3	Cyclists	32
3.5.4	Public Transport	32
3.6	Water Quality and Drainage	33
3.6.1	General Introduction	33
3.6.2	Comparison of Methodologies	33
3.6.3	Scheme Assessment	34
3.7	Policies and Plans	35
3.7.1	General Introduction	35
3.7.2	Policy Analysis	35
4	Conclusions	39
Appendix A	Air Quality	40

Appendix B	Policies and Plans	41
Appendix C	Revised Framework Tables	46

Tables

Table 3.1: Comparison of AQ DMRB Guide Values.....	3
Table 3.2: Background Pollutant Level.....	4
Table 3.3: Localised Air Quality Assessment: Results Summary 1998/2005.....	7
Table 3.4: Localised Air Quality Assessment: Results Summary 2005/2020.....	8
Table 3.5: Regional Air Quality impacts: Do minimum 2005 vs Do scheme 2005.....	9
Table 3.6: Regional Air Quality impacts: Do minimum 2020 vs Do scheme 2020.....	9
Table 3.7: BAP habitats in the proposed scheme area.....	14
Table 3.8: BAP species in the proposed scheme area.....	17
Table 3.9a: Baseline to Design Year Traffic Noise Impact (2005 - 2020).....	25
Table 3.9b: Baseline to Design Year Traffic Noise Impact (2005 - 2020).....	26
Table 3.9c: Baseline to Design Year Traffic Noise Impact (2005 - 2020).....	27
Table 3.10a: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening).....	28
Table 3.10b: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening).....	29
Table 3.10c: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening).....	30
Table 3.11: Scheduled Bus Services.....	32
Table B.1: Relevant SERPLAN Policies.....	41
Table B.2: Sheppey Development Opportunities.....	43
Group 1: Local People and their Communities.....	
Group 2: Travellers.....	
Group 3: The Cultural and Natural Environment.....	
Group 4: Policies and Plans.....	
Land Use Table.....	
Mitigation Table.....	

Figures

- Figure 1: Air Quality Receptor Locations
- Figure 2: Air Quality Receptor Locations
- Figure 3: Traffic Flows Used For Noise Calculations
- Figure 4: Key For Noise Impact Plans
- Figure 5: Noise Impact Plan
- Figure 6: Noise Impact Plan
- Figure 7: Noise Impact Plan

1 Introduction

The purpose of this document is to update various environmental subject areas in the light of new survey information or updated methodologies since the Environmental Statement (ES) was first published in January 1997. The opportunity is also taken to correct minor errors and inconsistencies in the original document that have come to light since that time. A revised framework is included as Appendix 3, which takes account of these changes. This document should be read alongside the original ES, as only the changes are highlighted in this document. Also relevant are the 'Schedule of Understanding and Undertakings' concerning water based issues which has been agreed jointly between the Highways Agency and the Environment Agency, a 'Statement of Imperative Reasons of Overriding Public Interest', and the Appraisal Summary Table (AST). These documents are available separately.

Subject areas referred to are treated in the same order as the original Environment Statement, except where there has been no change. The topics for which the original methodology and analyses published in January 1997 remain unchanged are Cultural Heritage, Disruption due to Construction, Landscape Effects, Land Use and Agriculture, Vehicle Travellers and Geology and Soils.

2 Corrections to the Original Environmental Statement

The following corrections should be noted regarding the original document.

Volume 1, Chapter 4: Description of the Proposed Scheme: Section 4.5 Construction and Maintenance p 4-5

Due to a typographical error, the end of the last line 'would be fill for the embankments' was inadvertently omitted from the end of the page. The last line should read 'The biggest single volume of material required for the construction of the road would be fill for the embankments'.

Volume 1, Chapter 5: The Environment: Existing Conditions, Mitigations and Predicted Effects of the Scheme, Section 5.5 Ecology and Nature Conservation, 5.5.3 Assessment of Impacts and Effects, (birds), table 5.5.18 'Concluded Effects on Birds to be Compensated', p 5-57

Due to a typographical error, the entry for Lapwing under the fourth column 'Compensation Provision' reads 13 pairs, instead of 8. The correct figure of 8 pairs is used in the table given in Volume 2 part 3 (Ecology and Nature Conservation) on p5-12 (table 5.7) of that document.

Volume 2 Part 3: Ecology and Nature Conservation, Section 5; Impacts and Effects, 5.2.4 (birds) table 5.4: 'Check List of Potential Impacts on Birds', p 5-10

Under this table the effect on birds for 'mortality due to vehicles' is given as 'none'. Whilst this impact is insignificant for the bird population as a whole, the impact should, however, more accurately be recorded under the 'permanent' column.

Volume 2 Part 9: Policies and Plans, Section 2 'Current Policy and Legislation' p 2-1

The study area is incorrectly stated as being a 'Special Area of Conservation', although its status as a Special Protection Area affords it the same protection as if it were an SAC.

3 Updates to Subject Areas

3.1 Air Quality

3.1.1 Introduction

Since the issue of the environmental statement, three factors have arisen which could have an effect on the previous conclusions:

- (a) Section 3 chapter 1 (Air Quality) of the DMRB Vol. 11 has been extensively revised and distributed in June 1999
- (b) The opening and design years have been deferred by two years
- (c) The traffic forecasts for the scheme have been revised

This revision therefore, considers the effect of these factors.

3.1.2 Existing Baseline Air Quality Conditions

Methodology for the baseline assessment: Localised impacts.

It is specified in the DMRB Vol 11 that for impacts which will occur after the road is open to traffic, the baseline conditions should be those which would exist just prior to opening to traffic (currently assumed to be 2005) assuming that the road had not been built. The Stage 2 results therefore needed to be reassessed to take into account traffic growth and improvements in emission control technology by that year. The revised assessment method is based on changes in the annual average hourly pollutant concentrations assuming high traffic growth factors. The baseline (and design year) concentrations are judged against appropriate Air Quality Standards defined in the DMRB and summarised below.

Four of the many pollutants found in vehicle emissions are used as indicators of air quality: carbon monoxide (CO), hydrocarbons (HC), nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀).

Air quality in future years clearly cannot be measured directly. The DMRB procedure for impact assessment therefore requires that, for a valid and consistent comparison, pollutant concentrations for both the baseline and design years are determined by calculation from the forecast traffic flows for the appropriate years using the method described below.

The Air Quality Standards (AQS)

An assessment of the significance of a particular concentration of a pollutant can be made by reference to a standard which is based on its known effects on health. The effects of the four indicator pollutants may vary with exposure time and frequency of occurrence and the selected

standards must reflect this accordingly. The AQ Standards specified in the 1999 revision to DMRB vol 11 have been revised in to be in line with those of the UK National Air Quality Strategy. The principal changes are objectives to be achieved by 2005 and include the following:

- (a) Additional statistical limits for NO₂
- (b) A standard for 1, 3 butadiene added
- (c) Total particulates (PM) replaced by PM₁₀

Table 3.1 compares the revised AQ Standards with the previous (1994) set.

Table 3.1: Comparison of AQ DMRB Guide Values

DMRB version	Pollutant	CO	NO ₂	NO ₂	NO ₂	1,3 butadiene	Benzene	Total PM	Total PM
1994									
	Averaging	8 hour	-	-	1 hour	N/a	1 year	1 day	1 year
	Frequency	Annual max			98 th percentile		1 day	95 th percentile	mean
	Limit/guide	9 ppm			105 ppb		5 ppb	300µg/m ³	150µg/m ³
1999								PM ₁₀	-
	Averaging	Max annual running 8 hour mean	1 hour mean	Annual mean	98th percentile of hourly means	Running annual mean	Running annual mean	99 th percentile of running 24 hour mean	-
	Limit value	10 ppm	150 ppb	21 ppb	105 ppb	1 ppb	5 ppb	50 µg/m ³	-

The method for prediction of air quality

The DMRB method for the prediction of pollutant concentrations in the baseline and design years is an empirical one based on a series of charts/tables which enable the concentrations of the four indicator pollutants described above to be determined from the forecast traffic flows and other parameters. The calculation procedure is summarised as follows:

- (i) The network of roads within 200 m of each selected receptor is divided into a number of continuous sections.
- (ii) For each section, the annual average hourly flows of light and heavy vehicles in the appropriate year are determined.
- (iii) For each section, the emission rate for each pollutant is estimated.
- (iv) Corrections are made for the effects of speed and distance to the receptor.
- (v) The contributions from all of the sections are summed to give the annual average hourly concentrations.
- (vi) The background concentrations from other sources are added
- (vii) Finally the overall annual average hourly concentrations are converted into values appropriate for comparison with the Air Quality Standards

If any of the concentrations exceeds the limit values, then it is recommended that a more thorough and detailed assessment should be made.

The 1999 revision to DMRB Vol 11/3/1 requires the separate addition of background concentrations to those calculated for road traffic before a comparison is made with the AQ standards. Ideally, these background levels should be derived from local measurements; otherwise tabulated default values should be used. Since a component of the background level comes from road traffic elsewhere, a correction reflecting the future general trend of reduction from this source is required to be applied for the assessment years, relative to a base year of 1996.

No suitable measured data were available for the immediate vicinity of the scheme. The annual mean background (1996) levels used in this assessment were derived from a consideration of published background maps (NETCEN, 1998 (see Appendix A) and the DMRB 1999 default values. The higher of the two values for each pollutant were taken as follows:

Table 3.2: Background Pollutant Level

Pollutant	CO ppm	NOx ppb	benzene ppb	PM ₁₀ µg/m ³
NETCEN maps	< 0.2	<15	.35	22.5 – 25
DMRB default Table A1.1	0.2	20	0.35	20
Background levels adopted for this assessment	0.2	20	.35	25

Calculations of existing and baseline air quality

The traffic flows and speeds were taken from the COBA (cost-benefit analysis) model developed for the scheme by Mott MacDonald. The receptors selected for the Stage 2 assessment were still considered to be representative of those likely to be the worst affected and are shown in Figures 1 and 2, together with two additional sites. Pollutant concentrations were calculated for each using the DMRB method (1999 revision). The traffic forecasts for the scheme have recently been revised. The existing and predicted baseline flows along the A249 have increased by varying amounts relative to the previous (Dec 1996) assessment.

The results for the existing (1998) and baseline (2005) years are presented in Table 3.3 of the Appendix (which also includes the results for the scheme just after opening). The following comments summarise the existing and baseline conditions.

CO The existing 8 hour maximum concentrations at all receptors are all well below the revised (1999) AQS limit and will fall to lower levels by the baseline year (as a greater proportion of the national vehicle fleet become equipped with emission control measures)

NO₂ The existing annual mean concentrations at all receptors are generally above or close to the revised AQS limit. Although they will fall slightly by the baseline year, the standard will remain exceeded at most receptors, by up to 40% at the roadside sites.

The existing 98 % ile of hourly mean concentrations at all receptors are well below the revised AQS limit and will fall to lower levels by the baseline year.

	The existing maximum hourly mean concentrations are above the revised AQS limit at receptors close to the existing roads. They will fall slightly by the baseline year, by which time the standard will not be exceeded at any of the receptors.
Benzene	The existing running annual mean concentrations at all receptors are all well below the revised AQS limit and will fall to lower levels by the baseline year
1,3 butadiene	The existing running annual mean concentrations at all receptors are all well below the revised AQS limit and will fall to lower levels by the baseline year.
PM ₁₀	The existing 99 th percentile of 24 hour mean concentrations at all receptors exceed the revised AQS limit. These levels will fall slightly by the baseline year but remain in excess of the standard, by up to 34% at the roadside sites.

In the case of the two pollutants which exceed the AQS limits (NO₂ and PM₁₀), the assumed background level forms a significant part of the total concentration, representing a greater proportion as the distance from the road increases. The background concentration of NO_x (used to calculate NO₂) forms about 30% of the total at roadside receptors and up to 70% at the more distant ones. Some measured NO₂ data is given in the Kent AQ Monitoring Network annual and monthly reports for Swale district. Levels of NO₂ at three non-kerbside sites in Sheerness (1997) were in the order of 11 ppb, i.e. well below the AQS annual mean limit of 21 ppb. The worst-case assumptions of Table 3.2 (20 ppm rather than <15 ppm) may therefore lead to a significant over-estimate of the results.

The background concentration of PM₁₀ forms about 86% of the total at roadside sites and up to 97% at the more remote ones. Data from non-roadside sites in Kent indicate that a concentration of about 17 µg/m³ would be more appropriate than the 25 µg/m³ assumed from the NETCEN map. The adoption of the former value would not, however, reduce the calculated concentrations to a level below the standard.

The combined effects of the higher baseline traffic flows and revised DMRB procedure have been to generally increase the calculated concentrations of CO and NO₂ and reduce the concentrations of benzene, relative to the previous assessment. Those of PM cannot be directly compared.

3.1.3 Predicted Impacts and Effects of the Scheme

Methodology for the assessment of localised air quality impacts and effects.

In order to assess the possible magnitude of local impacts, it is necessary to make a comparison between the baseline conditions and those which would exist in the design year, both with and without the scheme. Consideration is also given to the impact on opening (2005). Air quality in future years cannot be measured directly, thus the DMRB procedure requires that for a valid and consistent comparison, pollutant concentrations for the various situations are determined by calculation from forecast traffic flows. The traffic forecasts for the design year have not changed significantly since the previous (Dec 1996) assessment report. The calculation procedure was described in Section 3.2.1. An assessment of the significance of the impacts is made by reference to the recently revised AQS for each pollutant defined in Table 3.1. If any of the concentrations exceeds the limit values, then it is recommended that a more thorough and detailed assessment should be made.

Results of the localised air quality predictions

The results of the Air Quality predictions for 1998/2005 and 2005/2020 at each of the selected receptors are presented in Tables 3.3 and 3.4 respectively. A comparison between the existing and the baseline (1998 vs 2005 Do Nothing (DN)) situations was made in Section 3.1.2.

The results in Table 3.3 indicate that on opening (2005 DN vs 2005 Do Something (DS)):

- (d) 8 hour maximum concentrations of CO (already well below the AQS) would reduce or stay constant at all receptors except nos 3 and 4, where a slight increase would occur.
- (e) annual mean concentrations of NO₂ would reduce at all receptors except nos 3 and 5, where slight increases would occur. Those at receptors 2, 3 and 4 would remain slightly above the AQS.
- (f) 98% ile hourly mean concentrations of NO₂ (already well below the AQS) would fall except at receptors 3 and 5, where only slight increases would occur.
- (g) max hourly mean concentrations of NO₂ (all below the AQS) would fall to lower levels except at receptors 3 and 5 (which would remain within the AQS).
- (h) the running mean concentrations of 1,3 butadiene and benzene (all well below the AQS) would fall or remain constant, except at receptor 3 where only a slight increase would occur.
- (i) The 99% ile of 24 hour mean concentrations of PM₁₀ would fall slightly at all receptors except nos 3 and 6 where only slight increases would occur. All concentrations would remain in exceedance of the revised AQS.

A comparison between the baseline and design year with scheme (2005 DN vs 2020 DS) results in Table 3.4 indicates that if the scheme is built, the concentrations of all four indicator pollutants would decrease at all receptors except those of NO₂ at receptor 3. By 2020 with the scheme, all concentrations would remain within or fall below the AQS limits except those for PM₁₀, which would remain slightly above. A similar comparison indicates that if the scheme is not built (2005 DN vs 2020 DN) levels of all pollutants at all receptors would fall by 2020.

A comparison of the results with and without the scheme in the design year (2020 DN vs 2020 DS) indicates that, if the scheme is built, then in most receptor/pollutant cases pollutant levels would be reduced. The exceptions would be receptor 3 (all pollutants) and 5 (where very slight increases in NO₂ would occur. In the case of the two pollutants which exceed the AQS (NO₂ and PM₁₀), a high proportion of the total levels are due to the background (see Section 3.1.2).

The revised DMRB procedure has resulted in higher concentrations of CO, NO₂ and benzene relative to the previous assessment. That for PM₁₀ is not directly comparable. This has not affected the overall conclusion outlined below.

In summary, the scheme would not generate a significant impact on local air quality in the area. Local air quality will improve with the passage of time so that by the design year, pollutant concentrations at all receptors would generally be lower than the 2005 baseline.

Table 3.3: Localised Air Quality Assessment: Results Summary 1998/2005

Ref no	Receptor address	CO 8 hour annual max ppm			NO2 annual mean ppb			NO2 98% hourly means ppb			NO2 max hourly mean ppb			CH6 running annual mean ppb			1,3 Butadiene running annual mean ppb			PM10 99% of 24h mean ug/m3			
		1998		2005		1998		2005		1998		2005		1998		2005		1998		2005			
		DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS		
1	Queenborough Rd West side	2.9	2.2	1.5	33.1	28.5	14.0	82.8	71.3	35.0	165.5	142.5	70.0	0.64	0.42	0.27	0.13	0.08	0.06	82.6	67.1	60.9	
2	Lady Hamilton E cnr	2.8	2.0	1.9	29.5	24.5	22.0	73.8	61.3	55.0	147.5	122.5	110.0	0.58	0.38	0.35	0.12	0.08	0.07	81.0	65.6	64.1	
3	Lady Hamilton W cnr	2.5	1.8	2.0	25.0	21.5	24.0	62.5	53.8	60.0	125.0	107.5	120.0	0.50	0.34	0.38	0.10	0.07	0.08	77.6	63.8	65.0	
4	263 Queenborough Rd A250	2.9	2.0	2.1	32.0	27.0	25.0	80.0	67.5	62.5	160.0	135.0	125.0	0.62	0.39	0.39	0.12	0.08	0.08	82.7	66.4	65.4	
5	Queenborough CP School SE cnr	2.0	1.5	1.5	19.0	15.0	15.5	47.5	37.5	38.8	95.0	75.0	77.5	0.37	0.28	0.28	0.08	0.06	0.06	73.0	61.2	61.3	
6	62 Main Rd	2.3	1.7	1.7	22.5	19.0	19.0	56.3	47.5	47.5	112.5	95.0	95.0	0.45	0.31	0.31	0.09	0.06	0.06	75.6	62.5	62.5	
7	Neatscourt Cottages	2.8	2.0	1.5	31.0	26.5	13.0	77.5	66.3	32.5	155.0	132.5	65.0	0.61	0.39	0.27	0.12	0.08	0.05	82.4	66.5	60.8	
8	Cowstead Cottages	2.8	2.0	1.5	31.0	26.5	14.5	77.5	66.3	36.3	155.0	132.5	72.5	0.61	0.39	0.28	0.12	0.08	0.06	82.4	66.5	61.1	
AQ Standards DMRB Vol1/3/1 1999		10 ppm		21 ppb		105 ppb		150 ppb		5 ppb		1 ppb		50 ug/m3									

Note: **exceedances of the current AQ Standards are indicated in bold type**

Increases in pollutant concentrations on opening in 2005 are indicated in italics

Table 3.4: Localised Air Quality Assessment: Results Summary 2005/2020

Ref no	Receptor address	CO 8 hour annual max ppm				NO2 annual mean ppb				NO2 98% hourly means ppb				NO2 max hourly mean ppb				CH6 running annual mean ppb				1,3 Butadiene running annual mean ppb				PM10 99% of 24h mean ug/m3			
		2005		2020		2005		2020		2005		2020		2005		2020		2005		2020		2005		2020		2005		2020	
		DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS	DN	DS
1	Queenborough Rd West side	2.2	1.6	1.3	1.3	28.5	23.5	12.0	58.8	30.0	142.5	117.5	60.0	0.42	0.32	0.24	0.08	0.06	0.05	0.05	67.1	59.6	56.2	56.2	56.2	56.2	56.2	56.2	
2	Lady Hamilton E cnr	2.0	1.6	1.5	20.0	21.5	21.5	20.0	53.8	50.0	122.5	107.5	100.0	0.36	0.31	0.30	0.08	0.06	0.06	0.06	65.6	59.0	58.4	58.4	58.4	58.4	58.4	58.4	
3	Lady Hamilton W cnr	1.8	1.4	1.7	22.0	21.5	18.5	22.0	46.3	55.0	107.5	92.5	110.0	0.34	0.28	0.32	0.07	0.06	0.06	0.06	63.8	57.9	59.2	59.2	59.2	59.2	59.2	59.2	
4	263 Queenborough Rd A250	2.0	1.6	1.6	21.0	27.0	22.5	21.0	56.3	52.5	135.0	112.5	105.0	0.39	0.32	0.31	0.08	0.06	0.06	0.06	66.4	59.6	58.9	58.9	58.9	58.9	58.9	58.9	
5	Queenborough CP School SE cnr	1.5	1.3	1.3	13.0	15.0	12.5	13.0	31.3	32.5	75.0	62.5	65.0	0.28	0.25	0.25	0.06	0.05	0.05	0.05	61.2	56.4	56.4	56.4	56.4	56.4	56.4	56.4	
6	62 Main Rd	1.7	1.4	1.4	15.0	19.0	16.0	15.0	40.0	37.5	95.0	80.0	75.0	0.31	0.27	0.26	0.06	0.05	0.05	0.05	62.5	57.3	56.9	56.9	56.9	56.9	56.9	56.9	
7	Neatscourt Cottages	2.0	1.6	1.3	12.0	26.5	24.0	12.0	60.0	30.0	132.5	120.0	60.0	0.39	0.32	0.24	0.08	0.06	0.05	0.05	66.5	59.7	56.2	56.2	56.2	56.2	56.2	56.2	
8	Cowstead Cottages	2.0	1.6	1.3	13.0	26.5	24.0	13.0	60.0	32.5	132.5	120.0	65.0	0.39	0.32	0.25	0.08	0.06	0.05	0.05	66.5	59.7	56.4	56.4	56.4	56.4	56.4	56.4	
A Q Standards DMRB Vol11/3/1 1999		10 ppm		21 ppb		105 ppb		150 ppb		5 ppb		1 ppb		50 ug/m3															

Note exceedances of the current AQ Standards are indicated in bold type
Increases in pollutant concentrations without the scheme in 2020 are indicated in italics

Methodology for the assessment of the regional impact on air quality

To assess the total impact of the scheme, it is necessary to calculate the total quantity of pollutant emissions after the scheme has been built and deduct the estimated quantity from the existing road network on which traffic patterns are affected by the scheme. The method defined in the DMRB requires the traffic flow on each segment to be amalgamated with the speed related data to determine the total emissions of the four indicator pollutants CO, NO_x, HC, PM₁₀ and also CO₂. As in the case of localised impacts, data was taken from the COBA traffic model for the scheme.

Results of the regional air quality predictions

The results in terms of tonnes per annum for the opening and design years are summarised in Tables 3.5 and 3.6 respectively.

Table 3.5: Regional Air Quality impacts: Do minimum 2005 vs Do scheme 2005

Total emissions (tonnes per annum)

	CO	NO _x	HC	PM ₁₀	CO ₂
2005 do min	83.5	83.5	12.2	2.46	13056
2005 do scheme	92.2	83.5	11.1	2.34	13319
Difference	8.7	0	-1.1	-0.12	263
Percentage change	10.4	0	-9.0	-4.9	2.0

Table 3.6: Regional Air Quality impacts: Do minimum 2020 vs Do scheme 2020

Total emissions (tonnes per annum)

	CO	NO _x	HC	PM ₁₀	CO ₂
2020 do min	47.9	57.2	6.9	1.43	15620
2020 do scheme	69.6	71.9	7.9	1.71	20215
Difference	21.7	14.7	1.0	0.28	4595
Percentage change	45.3	25.6	14.5	19.5	29.4

If the scheme is not built, the total quantity of all pollutants (except CO₂) generated in the design year 2020 would fall as the effects of emission control measures increase. The quantity of CO₂ (not reduced by catalytic converters) produced would rise in line with regional traffic growth.

If the scheme is built, the annual quantities of all pollutants (except CO) generated within the area affected by the scheme remain essentially unchanged or fall slightly on opening. That for CO would rise by about 10% as the result of less complete combustion at the higher traffic speeds along the Iwade to Cowstead section.

By the design year, the annual quantities of all pollutants (except CO₂) would fall relative to the baseline. That of the greatest contributor, CO₂, would increase by 50%.

Relative to the do minimum scenario in the design year, the quantities of all pollutants would increase in line with the increase in traffic using the corridor to access the planned development enabled by the scheme. The quantity of CO₂ would increase by some 25%.

The revised DMRB procedure has predicted significantly lower annual pollutant quantities (and changes therein) than the previous assessment, since the background levels were previously included in the base data (and not added separately to obtain the local concentrations). The overall conclusions are not affected as a result.

3.1.4 Conclusions

Existing conditions, 1998

Calculations of local air quality using the revised (1999) DMRB method indicate that the existing (1998) and baseline (2005) concentrations of CO, benzene and 1,3 butadiene at representative receptors are well below the limits defined in the Air Quality Standards.

The existing concentrations of NO₂ and PM₁₀ are generally in excess of the AQ Standard limits. In the case of PM₁₀, the component due to traffic is small. The assumed background level alone is sufficient to exceed the current AQS limit. This exceedance would occur throughout southeast England and East Anglia according to the data supplied by NETCEN.

Baseline 2005

The indicator pollutant concentrations at all receptors will reduce slightly by the baseline/opening year (2005) as the result of improved vehicle emission standards and technology. The annual mean concentrations of NO₂ at most receptors and of PM₁₀ at all receptors will remain above the AQS limits.

Local Impacts on opening, 2005

Calculations for 2005 indicate that on opening, pollutant concentrations at properties close to the existing road would reduce. Concentrations at properties on the east side of Queenborough facing the proposed new carriageway would increase only slightly. The concentrations of PM₁₀ would remain above the AQS limits at all receptors, but the only other exceedance would be for NO₂ at the Lady Hamilton and properties facing the A250.

Local Impacts in the design year, 2020

If the scheme is not built, local pollutant concentrations would fall relative to the baseline year at all receptors. Concentrations of NO₂ would remain slightly in excess of the AQS limit for annual mean concentrations at the nearest properties but that for PM₁₀ would remain exceeded at all receptors.

If the scheme is built, local pollutant concentrations would all fall relative to the baseline except at the Lady Hamilton PH. Except for PM₁₀, the concentration of no indicator pollutants would exceed the AQS limits.

It is therefore concluded that the construction of the scheme would not generate a significant impact on local air quality. Since the concentration of PM₁₀ is dictated primarily by the background level and

would not be significantly affected by changes in road traffic, it is not proposed to undertake a detailed specialist AQ assessment.

Regional impacts on opening, 2005

If the scheme is built, the annual quantities of all pollutants (except CO) generated within the area affected by the scheme would fall on opening. That for the greatest contributor, CO₂, would fall by 3%.

Regional impacts in the design year 2020

If the scheme is built, the annual quantities of all pollutants (except CO₂) generated in the design year would fall relative to the baseline. That of the greatest contributor, CO₂, would increase by 50%.

Relative to the do minimum scenario in that year, the quantities of all pollutants would increase in line with the increase in traffic using the corridor to access the planned development enabled by the scheme. The quantity of CO₂ would increase by some 25%.

Comparison with previous report (Rev A, December 1996)

The recently revised traffic data and DMRB calculation procedure have resulted in some differences in local and regional impacts compared to the previous assessment report, but these have not altered the overall conclusions above.

3.2 Ecology and Nature Conservation

Since the ES was published, further survey work has been carried out by the Environment Agency for water voles. Water vole habitat is now protected under the Wildlife and Countryside Act, 1981 (as amended), and the survey found several signs of these animals in the vicinity of the proposed route. It is therefore proposed that additional surveys will be carried out prior to construction of the road, and an appropriate mitigation strategy formulated as necessary. These principles are stated in the draft 'Schedule of Understandings and Undertakings' which has been agreed with the Environment Agency.

In addition, the Kent Biodiversity Action Plan (BAP) has recently been published (1997) by Kent County Council. The following is an assessment of the effects of the scheme on UK and Kent BAP species and key habitats.

3.2.1 Biodiversity Action Plans: General Introduction

In 1995, the UK Biodiversity Group Published a list of some 1250 species which are classed as "Species of Conservation Concern". This list is recognised to be far from complete and will continue to be reviewed and expanded.

From it, the species most in need of conservation action have been categorised as "Priority Species". Priority Species are those which are globally threatened and/or are declining rapidly in the UK (i.e. by more than 50% in the last 25 years). The most recent list of Priority Species was published in 1998. It contains 520 individual species and several groups of species such as dolphins which are treated as one entry in the list.

In parallel, the Group reviewed conservation priorities related to habitats. There are 38 habitat types for which the UK has international obligations or are at risk, rare, functionally critical or important for Priority Species and all these are ranked as Key Habitats.

Biodiversity Action Plans (BAPs) have been or will be produced for all the Priority Species or for groups of species with similar requirements and for Key Habitats. The Plans aim to define the measures required to ensure the conservation of these species and habitats and thereby to contribute to maintaining the UK's total biodiversity resource.

UK BAP lists and completed plans have been published in two reports:-

Biodiversity: The UK Steering Group Report Vol 2: Action Plans. HMSO 1995.
UK Biodiversity Group Tranche 2 Action Plans Vol 1 - vertebrates and vascular plants. English Nature 1998.

As well as the UK BAP programme, most counties and some other administrative units and organisations have produced biodiversity strategies and plans. The Kent BAP has been developed on the dual rationale that the traditional management of semi-natural habitats will cater for the conservation of most species and that all habitats add to the richness of biodiversity in the county. By embracing the range of local conditions, the BAP aims to reinforce local distinctiveness and thereby to complement English Nature's "Natural Areas Strategy". Action Plans have therefore been prepared for all the 19 major habitat types present in the county. The nature of the proposed actions for each habitat reflect its relative importance and the level of threat to it. Species action plans have been produced for 13 species, including some for which Kent is the national stronghold and others which are essential indicators of habitat quality and health.

The Kent BAP is published in:-

Kent Biodiversity Action Plan. Kent County Council 1997

3.2.2 Methodology and sources

In order to assess the possible effects of the A249 road improvement on UK and Kent Biodiversity goals, a comprehensive analysis was carried out using data collected for the ecological assessment of the site through which the road improvement scheme would run. These data embrace habitat types, plants, invertebrates, fish, amphibians, reptiles, birds and mammals. They are summarised in the Environmental Statement Volume 2 Part 3 and set out in full in a total of 13 survey reports listed in it at Section 1.4.2. In addition, analysis took into account information on two species (brown hare and water vole) that have been recorded from the site since the original assessment was completed..

The analysis identified all those habitats and species that occur on the site and are UK Priority Species, UK Key Habitats, Kent BAP habitats or Kent BAP species, as listed in the three publications referred to above.

The direct and indirect impacts of the proposed road scheme were then checked against each of these habitats and species to determine whether there would be any effect on them and, if so, whether the proposed mitigation and compensation measures were adequate to ensure that the scheme would not conflict with UK or Kent BAP goals. The results of this analysis are given below.

3.2.3 Measures to address possible effects on Key Habitats

A total of six habitats for which UK and/or Kent BAPs have been prepared occur in the area of potential direct and indirect impacts of the A249 scheme, though not all are actually effected by the proposed scheme. They are listed in Table 1, which summarises the extent of the resource and effects of the proposed scheme, before and after application of the proposed mitigation and compensation measures. For those habitats affected, further detail is given under the individual habitat headings below.

Lowland farmland

Extent

In the UK, over 11 million ha. In Kent, 262, 290 ha, possibly declining slightly.

UK objectives

This habitat is not considered by the UK BAP process, though a number of species that still survive on farmland are in the list of Priority Species.

Kent objectives

The Kent BAP includes it principally as the focus of measures directed at Priority Species through promotion of environmentally-sensitive policies, measures such as ESAs and advice.

English Nature Natural Area goals

Maintain the characteristic farmland bird community including wintering waders and wildfowl.

Management requirements

Depend on what Priority Species are present but principally reversion to traditional, non-intensive farming regimes.

Scheme effect

Permanent loss of 8ha due to land-take. Land has negligible wildlife value.

Compensation measures

No nature conservation related measures required.

Effect post-compensation

None on specific BAP goals.

Table 3.7: BAP habitats in the proposed scheme area

Habitat type	Extent and trend		Effect of scheme pre-compensation	Effect of scheme post-compensation
	UK	Kent		
Lowland farmland	not addressed by BAP process	262,290 ha, stable	loss of 8ha with low wildlife value	No effect on BAP goals
Hedgerows	450,000 km, decreasing	8,112 km, decreasing	none	None
Saltmarsh	45,000 ha, decreasing	1,395 ha, decreasing	none	None
Grazing marsh	10,000 ha, decreasing	2286 ha, decreasing	loss of 12 ha, of which 8 ha has no protection from destruction by farming change.	Creation of 22 ha under conservation management. Significant net benefit
Ditches	not addressed outside context of the adjacent habitat e.g. grazing marsh.	2368 km, decreasing	loss of 570 m of which 510 m not protected from damaging management	Creation of more than 570 m., part in conservation management. Improved protection from pollution risk. Significant net benefit.
Intertidal mud and sandflats	>260,000 ha, decreasing	>7871 ha, decreasing	loss of 0.01ha	Loss of 0.01ha; not significant.
Marine	not stated, stable	not stated, stable	loss of 0.1 ha	Loss of 0.1 ha; not significant

Grazing marsh

Extent

In the UK, there is an estimated 10,000 ha of agriculturally-unimproved grazing marsh. In Kent, there is 2268 ha. Most of the habitat is in SSSIs but some decline continues.

UK objectives

Maintain the habitat extent. Create 2,500 ha of new grazing marsh by reversion from arable.

Kent objectives

Maintain and improve management of the habitat. Create new grazing marsh by reversion from arable.

English Nature Natural Area goals

Maintain and expand the habitat.

Management requirements

Low-intensity grazing, no fertiliser, no herbicides, high water table, brackish conditions for some species.

Scheme effect

There will be a loss of 4 ha of grazing marsh from within the SSSI and a further 8 ha outside it.

Compensation measures

A total of 22 ha of grazing marsh will be created on former arable land and managed under a 30 year agreement.

Effect post-compensation

A gain of 10 ha in the total extent of grazing marsh. As 8 ha of the land to be lost is outside the SSSI

and is not protected from agricultural improvement nor managed for conservation, the effective safeguarded gain is 18 ha.

Ditches

Extent

The extent of ditches with some wildlife value in the UK is unknown. In Kent, there are 2368 km of ditches in the low lying areas that include grazing marsh and this extent of ditches is considered to have declined significantly.

UK objectives

Ditches are not specifically addressed.

Kent objectives

Increase the extent and improve management.

English Nature Natural Area goals

Protect and encourage good management.

Management requirements

Manage on rotation. Prevent pollution. Do not alter flow regime or salinity status on grazing marsh.

Scheme effect

There will be a loss of 60 m of open ditch within the SSSI and 510 m of ditch outside it due to culverting. In addition, roadside drains of poor wildlife value will be lost due to road widening.

Compensation measures

At least an equivalent length of ditch will be created. Roadside drains will be replaced by an isolated drainage system, leading to improved water quality in the adjacent ditch network. Further new ditch habitat will also be created on the compensation land.

Effect post-compensation

An overall increase in the extent of ditches of good wildlife quality and protection from pollution by road drainage.

Intertidal mud and sand flats

Extent

In the UK, over 260,000 ha. In Kent, there are 10,300 ha. Currently, the rate of habitat loss has slowed but continues.

UK objectives

Maintain habitat extent, improve water quality and reduce the impacts of fisheries.

Kent objectives

Maintain habitat extent, improve quality through coastal zone planning, create new habitat.

English Nature Natural Area goals

Maintain extent and quality of the resource.

Management requirements

Principally through control of potential negative impacts such as reclamation, dredging, commercial shellfishery, pollution.

Scheme effect

Loss of 0.01 ha to placement of bridge piers.

Compensation measures

None practicable for the habitat but the very small and insignificant effect on wintering birds will be offset by management for them on the compensation land.

Effect post-compensation

Minimal and insignificant.

Marine

Extent

Not defined.

UK objectives

Where in estuaries, treated as part of them. Maintain habitat extent, improve water quality and reduce the impacts of fisheries.

Kent objectives

Plan overlaps with that for Intertidal Mud and Sand Flats. Maintain habitat extent and improve water quality.

English Nature Natural Area goals

Maintain quality of the resource.

Management requirements

Principally through control of potential negative impacts such as fisheries, pollution, dredging, reclamation.

Scheme effect

Bridge piers will be placed in the Swale sub-tidal channel. The channel does not contain any of the species listed in the Kent BAP as indicative of high habitat quality.

Compensation measures

None.

Effect post-compensation

Insignificant.

3.2.4 Measures to address possible effects on Priority Species

Eleven species that are on the UK BAP Priority list or for which action plans have been prepared in the Kent BAP occur in the area of potential impact. They are listed at Table 2 which summarises the effects of the proposed scheme, if any, before and after the application of mitigation and compensation measures. For those species that are affected, further detail is given under the individual species headings below.

Brown hare

Population size

UK population estimated at 817,500 to 1,250,000, possibly now stable.

UK objectives

Maintain and expand population, doubling spring numbers by 2010.

Kent objectives

None specific but embraced in aims for grazing marsh retention and lowland farmland management.

English Nature Natural Area goals

Maintain and expand the population.

Management requirements

Maintenance of mixed farming regimes with spring cereals and grass.

Scheme effect

Possible slightly increased risk of road mortality.

Compensation measures

Creation of increased area of grazing marsh in long-term conservation management (see *Grazing marsh*, above).

Effect post-compensation

Neutral or slightly positive.

Table 3.8: BAP species in the proposed scheme area

Species	UK Priority Species	Kent BAP Species	Population trend	Effect of scheme pre-compensation	Effect of scheme post-compensation
Otter	Yes	Yes	Increase	None	None.
Brown hare	Yes	No	Possibly stable	Possible increase in road mortality	Overall increase in area of good quality habitat
Water vole	Yes	Yes	Decline	Loss of potential ditch habitat. Slight increase in habitat fragmentation	Increase in habitat area. Possibly improved habitat connectivity.
Grey partridge	Yes	No	Decline	Loss of potential grazing marsh habitat	Overall increase in area of good quality habitat
Turtle dove	Yes	No	Decline	None	None
Skylark	Yes	No	Decline	Loss of habitat.	Overall increase in area of good quality habitat
Song thrush	Yes	No	Decline	None	None
Linnet	Yes	No	Decline	None	None
Reed bunting	Yes	No	Decline	None	None
Corn bunting	Yes	No	Decline	None	None
Great crested newt	Yes	No	Decline	Possible loss of potential ditch habitat	None

Water vole

Population size

Possibly a million animals at start of breeding season. Declining.

UK objectives

Maintain distribution and regain some lost ground.

Kent objectives

Arrest the decline by 2000.

English Nature Natural Area goals

Maintain current distribution and abundance.

Management requirements

Watercourses with abundant emergent and marginal plants, especially grasses.

Scheme effect

Possible slight increase in road mortality risk. Loss of ditches.

Compensation measures

Watercourses provided under roads. Restoration of good quality ditch habitat greater in extent than the amount removed. Protection of ditch network from pollution by road drainage (see *Ditches*, above).

Effect post-compensation

Neutral or slightly positive.

Grey partridge

Population size

Estimated at 150,000 pairs in the UK

UK objectives

Halt the decline.

Kent objectives

None specific but embraced in aims for lowland farmland management.

English Nature Natural Area goals

Increase range and numbers.

Management requirements

More plant diversity and invertebrate fauna on farms, predator control.

Scheme effect

Loss of 12 ha of grazing marsh possibly used at times by the species.

Compensation measures

Increased area of grazing marsh in long term conservation management (see *Grazing marsh*, above).

Effect post-compensation

Neutral or slightly positive.

Skylark

Population size

UK population estimated at 2,100,000 pairs

UK objectives

No plan yet produced

Kent objectives

None specific but embraced in aims for lowland farmland management.

English Nature Natural Area goals

Maintain present population.

Management requirements

Hay meadows, low intensity grazing, spring cereals, reduced agrochemical inputs, mixed farming.

Scheme effect

Displacement of up to 15 pairs.

Compensation measures

Increased area of grazing marsh in long-term conservation management (see *Grazing marsh*, above).

Effect post-compensation

Neutral or slight positive.

Great crested newt

Population size

Unknown but widespread and locally numerous.

UK objectives

Maintain populations. Increase numbers of suitable ponds.

Kent objectives

Maintain populations. Increase area of suitable habitat.

English Nature Natural Area goals

Maintain and restore populations.

Management requirements

Unpolluted ponds without fish and with adjacent good terrestrial habitat e.g. woodland.

Scheme effect

Loss of ditches possibly suitable for the species, which occurs near the construction corridor.

Compensation measures

Watercourses provided under roads. Restoration of good quality ditch habitat greater in extent than the amount removed. Protection of ditch network from pollution by road drainage (see *Ditches*, above).

Effect post-compensation

Increase in potential habitat.

3.2.5 Effects On UK and Kent Biodiversity Species Of Conservation Concern

The following Species of Conservation Concern ("long list" species) were recorded in the construction corridor. Note that many are unaffected by the proposed scheme. The listings follows the sequence used in the long list, which is alphabetic by scientific name.

Mammals

water vole
brown hare

Birds

reed warbler
skylark
shoveler
teal
wigeon
mallard
meadow pipit
short-eared owl
pochard
dunlin
linnet
goldfinch
mute swan
reed bunting
kestrel
snipe
swallow
yellow wagtail
curlew
whimbrel
grey partridge
ruff
grey plover
dunnock
shelduck

redshank
song thrush
lapwing

Amphibians

great crested newt (occurs outside but near the corridor)

Invertebrates

great silver diving beetle
a hoverfly *Lejops vittata*

3.3 Land Use and Agriculture

3.3.1 General Introduction

Since the publication of the Environmental Statement, there have been two developments which affect the results of the original agricultural analysis, as outlined in the following section.

3.3.2 Revised Assessment

South Marshes, Ferry Road Marshes and Neatscourt Marshes

The livestock handling facilities for the above farming unit were originally at Neatscourt Manor, necessitating a diversion to maintain livestock access. In the environmental statement mention was made of the farmer's pending application for planning permission to relocate these facilities onto the marshland, which would have avoided the severance effects. This permission has now been granted.

Cowstead Farm

The scheme proposals result in the severance of two parcels of land near Cowstead Corner, requiring a long diversion along a private means of access to maintain the existing regime. Following further discussion with the farmer, the Highways Agency have agreed in principle to purchase the severed plots, should the scheme proceed, which removes this effect.

3.3.3 Conclusion

These changes have reduced further the severance effects of the scheme, resulting in a more beneficial outcome for the agricultural resource.

3.4 Traffic Noise and Vibration

3.4.1 General Introduction

Since the publication of the original analysis in January 1997 three factors have arisen which could have an effect on the original conclusions:

- (i) The opening/design years have been deferred by two years, from 2003 to 2005 and 2018 to 2020 respectively
- (ii) The traffic forecasts have been revised
- (iii) It was announced in the Government's recent Roads Review that "from now on, quieter road surfaces will be specified in future contracts as a matter of course" (A New deal for Transport, DETR, July 1998).

This revision therefore considers the effect of these factors and highlights the differences from the original analysis.

3.4.2 Revised Impact Assumptions

The traffic data have been taken from the COBA model developed for the scheme by Mott MacDonald and are shown in Fig 3. High growth values have been assumed for both years. The traffic forecasts for the scheme have been revised since the January 1997 report. In summary, the baseline year flows on the existing network and immediate post-opening flows on the proposed scheme have been revised upwards, whereas the design year flows on the proposed scheme have not changed significantly.

Following the announcement regarding quieter road surfaces in the Roads Review an appropriate correction has been made for noise generated by traffic using the proposed new carriageways. The Department of Transport Calculation of Road Traffic Noise (CRTN) procedure specifies a correction for normal bituminous, concrete or pervious asphalt surfaces only and does not consider the "quiet" surfaces developed since its publication (1988). Advice has been received from the HA that the CRTN correction for pervious surfaces (- 3.5 dB) should be applied to the new generation of quiet surfaces until better information is available, and has been adopted for this assessment.

Prior to the assumption that a "quiet" surface would be applied to the proposed carriageways, it was proposed that bunds would be constructed along the western side of the new alignment at Queenborough to provide some protection for the School and housing estates. These measures have been retained in the design and their effects included in this noise impact assessment.

3.4.3 Results of the Revised Traffic Noise Predictions

The results of some of the predictions of traffic noise impacts at selected receptors for the opening year (2005) and design year (2020), both with and without the scheme (and including the effects of the provisional mitigation measures described in Section 3.3.2), are presented in Figures 4 - 7. The impacts for the design year relative to the pre-opening situation are summarised below and any differences with the previous 1997 results highlighted.

Noise levels in the marshes between the Swale and Cowstead are dependent on the distance from the existing road. The combined result of increased traffic and speeds in 2020 would be to increase noise levels typically by 2 to 3 dB (previously 3 to 5 dB).

Properties facing Queenborough Road south of the proposed junction would experience a decrease of at least 10 dB at their front facades (previously 5 to 10 dB) while those on the southwest side would not experience any increase to the rear - removal of the existing noise source at the front would be offset by the introduction of the proposed scheme to the rear.

Properties facing Queenborough Road north of the proposed junction would experience an increase of about 1 dB at their front facades.

Properties facing Main Road would experience a decrease of about 1 dB as a result of the reduced traffic flow on that road.

Properties in the Borough Road area south of Main Road would experience an increase of up to 3 dB, depending on their proximity to Main Road. (Previously 5 to 10 dB).

Properties in a similar situation north of Main Road would experience a similar increase. (Previously a lesser increase of about 1 dB).

The eastern facade of Queenborough County Primary School would experience an increase of less than 1 dB. (Previously up to 3 dB).

The Lady Hamilton public house would experience an increase of 5 dB (previously 9 dB) on the western facades but a decrease of about 3 dB on the eastern facades. (Previously 2 dB).

From these calculations at selected receptors, an estimate of the overall impact has been made by interpolation. The results are presented in the Noise Assessment Summary of Table 3.9. As required by the DMRB, the table is split into sections, one for each of the baseline bands 50<60, 60<70 and >70 dB.

A consideration of Table 3.9 shows that:

- (i) If the scheme is not built, some 378 dwellings (previously 309) would experience a noise increase of 1 to 3 dB by the design year (2020) as a result of the general increase in traffic in line with regional growth forecasts.
- (ii) If the scheme is built, then the number of dwellings similarly affected would drop to 81, (previously 177) resulting from the realignment of the carriageways and noise mitigation measures. One dwelling would, however, be affected by a noise increase of 5 to 10 dB. (Previously 27 dwellings, with a further 60 in the band 3 to 5 dB).

Conversely if the scheme is built, along Queenborough Road south of the existing junction there would be a decrease of 1 to 3 dB at 1 dwelling, a decrease of 10 to 15 dB at 9 dwellings and a decrease of 5 to 10 dB at 2 dwellings. (Previously a decrease of 3 to 10 dB at 11 dwellings along Queenborough Road south of the existing roundabout).

A similar assessment has been undertaken for the opening year. The impacts and effects are summarised in Table 3.10. One dwelling would experience an immediate increase of 1 to 3 dB, (previously 76) and 1 dwelling an increase of 3 to 5 dB (previously 36). Conversely a total of 72 dwellings would enjoy a decrease predominantly in the range between 1 and 3 dB, including a limited number which would experience decreases of up to 15 dB.

Traffic noise levels (free field) for the three representative wildlife sites alongside the Swale near to the viaduct have also been calculated: On opening, the level is likely to reduce by about 1 dB at 250 m, and remain unchanged at distances of 500 m and 1 km. (previously, the levels would have been likely to increase by about 3 dB, 1 to 5 dB and 1 dB at distances of 250 m, 500 m and 1 km respectively.)

Preliminary calculations indicate that five dwellings (previously ten) may qualify for sound insulation.

3.4.4 Conclusions

The use of a low-noise surface would generate noise levels 3.5 dB lower than a normal HRA surface. This has resulted in a significantly lower number of impacts compared to the previous (1996/7) assessment for the scheme.

Baseline to Design Year Traffic Noise Impact (2005 – 2020)

Table 3.9a: Baseline to Design Year Traffic Noise Impact (2005 - 2020)

Ambient 50<60 Noise band	Residential		Commercial		Industrial		Community facilities		Comments
	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level	66	346	0	0	0	0	0	2	Borough Hall Bowling green
$L_{A10\ 18h}$ dB	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Increase in nuisance level	209	346	N/A	N/A	N/A	N/A	N/A	N/A	
<10%	2	0							
10<20%	0	0							
20<30%	0	0							
30<40%	0	0							
Decrease in noise level L_{A10}	0	0	0	0	0	0	0	0	
$18h$ dB	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Decrease in nuisance level	72	0	N/A	N/A	N/A	N/A	N/A	N/A	
<10%	0	0							
10<20%	0	0							
20<30%	0	0							
30<40%	0	0							

Table 3.9b: Baseline to Design Year Traffic Noise Impact (2005 - 2020)

Ambient band	Residential		Commercial		Industrial		Community facilities		Comments
	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level $L_{A10, 18h}$ dB	3	12	0	1	0	0	1	2	Ambulance Station (PS), School/ Ambulance Station (DM)
	0	0	0	0	0	0	0	0	
	1	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Increase in nuisance level	3	12	N/A	N/A	N/A	N/A	N/A	N/A	
	0	0							
	1	0							
	1	0							
Decrease in noise level $L_{A10, 18h}$ dB	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Decrease in nuisance level	6	0	N/A	N/A	N/A	N/A	N/A	N/A	
	0	0							
	0	0							
	0	0							

Table 3.9c: Baseline to Design Year Traffic Noise Impact (2005 – 2020)

Ambient >70 Noise band	Residential		Commercial		Industrial		Community facilities		Comments
	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level	12	20	0	0	0	0	0	0	
$L_{A10} 18h$ dB	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Increase in nuisance level	15	27	N/A	N/A	N/A	N/A	N/A	N/A	
<10%	0	0							
10<20%	0	0							
20<30%	0	0							
30<40%	0	0							
Decrease in noise level	1	0	1	0	0	0	0	0	Garage
$L_{A10} 18h$ dB	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	
Decrease in nuisance level	1	0	N/A	N/A	N/A	N/A	N/A	N/A	
<10%	2	0							
10<20%	4	0							
20<30%	5	0							
30<40%									

Baseline Year Traffic Noise Impact (2005 Pre And Post Opening)

Table 3.10a: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening)

Ambient band	Residential		Commercial		Industrial		Community facilities		Comments
	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level L _{A10 18h} dB	1<3	0	0	N/A	0	N/A	0	N/A	
	3<5	0	0	0	0	0	0	0	
	5<10	0	0	0	0	0	0	0	
	10<15	0	0	0	0	0	0	0	
	>15	0	0	0	0	0	0	0	
Decrease in noise level L _{A10 18h} dB	1<3	54	0	N/A	0	N/A	0	N/A	
	3<5	0	0	0	0	0	0	0	
	5<10	0	0	0	0	0	0	0	
	10<15	0	0	0	0	0	0	0	
	>15	0	0	0	0	0	0	0	

Table 3.10b: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening)

Ambient 60<70 Noise band	Residential		Commercial		Industrial		Community facilities		Comments
	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level L_{A10} 18h dB	1 3<5 0 0 0	N/A	0 0 0 0 0	N/A	0 0 0 0 0	N/A	1 0 0 0 0	N/A	Ambulance Station
Decrease in noise level L_{A10} 18h dB	6 0 0 0 0	N/A	0 0 0 0 0	N/A	0 0 0 0 0	N/A	0 0 0 0 0	N/A	

Table 3.10c: Baseline Year Traffic Noise Impact (2005 Pre and Post Opening)

Ambient band	>70 Noise	Residential		Commercial		Industrial		Community facilities		Comments
		Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	Proposed scheme	Do minimum	
Increase in noise level L_{A10} 18h dB	1<3	0	N/A	0	N/A	0	N/A	0	N/A	
	3<5	0		0		0		0		
	5<10	0		0		0		0		
	10<15	0		0		0		0		
	>15	0		0		0		0		
Decrease in noise level L_{A10} 18h dB	1<3	0	N/A	0	N/A	0	N/A	0	N/A	
	3<5	1		0		0		0		
	5<10	2		0		0		0		
	10<15	4		0		0		0		
	>15	5		0		0		0		

3.5 Pedestrians, Cyclists, Equestrians and Community Effects

3.5.1 General Introduction

Following the publication of the Government's new transport white paper, 'A New Deal for Transport' (DETR,1998), greater emphasis has been placed on the integration of various modes of transport.

The existing Kingsferry Bridge carries both the A249 and the branch electrified railway line from Sittingbourne to Sheerness, and there is currently no specific provision for pedestrians and cyclists. This section describes how the proposed improvement provides integration within and between different types of transport, and in particular, walking, cycling and public transport.

3.5.2 Pedestrians

Following construction of the new bridge, pedestrian safety across Kingsferry Bridge and between Cowstead and Queenborough roundabouts on the existing road would significantly improve, with most of the traffic passing along the new dual carriageway. A separate cycleway/footway, to be provided between Cowstead Farm and the south side of Kingsferry Bridge, would provide a more pleasant environment for walking than the narrow verge of the existing trunk road. The retention of the existing bridge for use by pedestrians and cyclists would significantly improve facilities, with predicted traffic flows reducing by over 90% to 2 700 to 3 000 vehicles per day in 2005 with the scheme, but 32 100 to 37 000 vehicles per day without the scheme. At Queenborough roundabout there would be between 22 100 and 25 900 vehicles per day in 2005 on the A249 south of the roundabout. With the provision of the signalled pedestrian/cyclist crossing (a Toucan crossing) in place of the existing roundabout pedestrians would be able to cross the junction safely.

3.5.3 Cyclists

The retention of the existing road bridge and provision of a new local access road link to the old Queenborough Road for pedestrian and cycle access would also provide a significant benefit to cyclists, given that most of the through traffic would transfer to the new route. The benefits in terms of safety and environment of the cycleway/footway between Cowstead Farm and south of Kingsferry Bridge and the Toucan crossing at Queenborough would apply equally to cyclists. The Sustrans national cycle route would also benefit from the retention of the existing bridge and the removal of most traffic.

3.5.4 Public Transport

Scheduled bus services using Kingsferry Bridge during weekdays are shown in Table 3.9. All the routes serve Iwade village, although some commuter coaches call on request only.

Table 3.11: Scheduled Bus Services

Route	Number of buses per weekday	
	Southbound	Northbound
165 Leysdown – Faversham	5	5
338 Leysdown – Chatham (Monday only)	1	1
341 Leysdown – Maidstone (Tuesday and Friday only)	1	1
342 Leysdown – Hempstead Valley (Thursday only)	1	1
341 Sheerness – Sittingbourne	7 (1 school days only)	7 (2 school days only)
C1-C7 London Commuter Coaches	4	7
E1-E12 London Commuter Coaches	4	4
School buses (school days only)	2	3
Total on school days	23	27

Bus services serving Iwade village are likely to continue to use the existing Kingsferry Bridge because of the restricted movements possible at the interchange at the southern end of the new bridge. However, bus journey times and reliability will improve with the removal of delays at Queenborough and Cowstead roundabouts, and reduced traffic on the existing bridge.

On weekdays, there are 37 passenger trains northbound and 36 southbound across Kingsferry Bridge. Apart from one service in each direction to and from Gillingham, all trains connect Sheerness with Sittingbourne calling at Queenborough, Swale, and Kemsley, with connecting services at Sittingbourne for London, Canterbury, and Ramsgate. Kent County Council is proposing to study the feasibility of upgrading the service to light rail standard with additional stations and possible line extensions. The railway is also used for freight traffic to and from Sheerness Port. The operation and reliability of train services is not affected by the A249 improvement.

3.6 Water Quality and Drainage

3.6.1 General Introduction

This particular section of the DMRB was substantially revised in February 1998, and the following description compares the new methodology with the old and assesses the implications for the scheme.

3.6.2 Comparison of Methodologies

The revised chapter broadly follows the outline of the previous one, but there are certain additional tasks highlighted for each of the key stages of Environmental Assessment during scheme development which are summarised as follows:

Stage 1 (Preliminary Assessment)

- (j) Identify fisheries.
- (k) Identify any other interested parties other than the Environment Agency if applicable (eg the British Waterways Board for canals).
- (l) Using predicted traffic flows, assess the overall risk of a serious accidental spillage in the absence of mitigation. Detailed calculations and worked examples are provided to show how this is done, the aim being to highlight areas of high risk and then propose suitable mitigation measures. These might be interception facilities or the relocation of discharge points to bring the risk of potential pollution down to acceptable levels.

Stage 2 (Assessment of Route Options)

- (a) Calculate the potential for localised pollution effects (ie pollution arising from normal operation of the road) for the area in question. This is done using the formula provided (with worked examples) and is based on measuring the dilution effects of road contaminants (from traffic flows, surface runoff area and empirical pollution data) and comparing these with the water quality standard (EQS) for the receiving watercourse. If the results indicate a significant problem, to the extent that mitigation could prove difficult or impossible, then it may be necessary to carry out specialist computer modelling using site specific data.
- (b) Refine the spillage risk calculations.
- (c) Assess the effects of the options on the physical and biological habitat of the corridor, possibly using biological resource mapping.

Stage 3 (Assessment of Preferred Route)

The results of the stage 1 and 2 assessments should be refined, including the calculations of spillage risk and localised pollution effects, together with any computer modelling if appropriate. A summary outlining the predicted impact on the receiving water (both with and without mitigation) should be presented.

3.6.3 Scheme Assessment

In the case of this scheme, the sensitive nature of the environment has meant that special considerations have been incorporated from the outset. The biological resource, including the fishery, has been assessed through consultation with relevant parties, augmented by detailed field surveys where necessary. The physical environment has also been assessed in a similar way, including a hydrological field survey of the drainage ditches.

Most of the scheme consists of online widening of the existing road, where current runoff flows directly into the marshland system without any provision for interception or pollution control. Thus there already exists a certain amount of localised pollution and the potential for a spillage incident. In view of the high ecological value of the area a decision was taken at an early stage to provide a separate drainage system (outfalling to the Swale or West Minster Drain via interceptors) thereby avoiding any further localised pollution or the risk of accidental spillage into the marshes. This is a

substantial improvement over the existing situation and is a significant benefit of the scheme, the principles of which have been agreed with the Environment Agency.

The new drainage system will result in substantial benefits over the existing situation, and avoid the risk of pollution into the marshes. Therefore, there is no requirement for further work as a result of the revised DMRB Volume 11 methodology.

3.7 Policies and Plans

3.7.1 General Introduction

Since the preparation of the original Environmental Statement there have been various developments in government policy in the areas of transport and land use planning, with a new emphasis on "integrated transport". This means a new emphasis on the need for the integration of land use planning and transport policies and subsequent integration between transport modes. This addendum therefore provides a summary of relevant policy documents, published since the preparation of the Environmental Statement. In addition, informal consultation regarding modifications to the new Swale Borough local plan (due to be published in July 1999) are also provided. The documents reviewed are as follows:

- A New Deal for Transport: Better for Everyone – The Government's White Paper on the Future of Transport (DETR 1998)
- PPG7 (Revised) The Countryside – Environmental Quality and Economic and Social Development, February 1997
- RPG11 Regional Planning (Public Consultation Draft, February 1997)
- A Sustainable Development Strategy for the South East – SERPLAN December 1998
- A better quality of life – A strategy for sustainable development for the UK (DETR, 1999)
- Swale Borough Local Plan (informal consultation regarding proposed modifications).

3.7.2 Policy Analysis

(i) A New Deal for Transport: Better for Everyone – The Government's White Paper on the Future of Transport (DETR 1998)

The White Paper presents a fundamental review of transport policy. It is recognised that building new roads is not the complete answer to resolving traffic congestion, but that new schemes should form part of an overall package of measures including public transport and better use of the existing network. The government therefore sees the way forward through an integrated transport policy, that provides:

- 'integration within and between different types of transport – so that each contributes its full potential and people can move easily between them;
- integration with the environment – so that our transport choices support a better environment;

- integration with land use planning – at national, regional and local level, so that transport and planning work together to support more sustainable travel choices and reduce the need to travel;
- integration with policies for education, health and wealth creation – so that transport helps to make a fairer, more inclusive society.'

The new deal for transport will be partly implemented through local transport plans prepared by the local authorities. These will include integrated transport strategies for local needs; local targets (eg for air quality, road safety etc); and greater use of traffic management. Local Transport Plans are not yet statutory, but the government aims to introduce them on a non-statutory basis during 1999.

A new deal for the motorist will include improved management of the trunk road network to reduce delays; investment focused on improving reliability of journeys; and better maintained roads – increased resources both locally and nationally. The government's aim is to make better use of existing trunk roads, it recognises that parts of the trunk road network are under considerable stress, and it wants to provide a coherent policy for improving them. The priorities for trunk roads will complement improvements to inter-urban travel. Carefully targeted capacity improvements will address congestion on the network where they support the integrated transport policy.

New investment criteria will be used to decide when and where to invest in the network as follows:

- integration – ensuring that all decision are taken in the context of the integrated transport policy
- safety
- economy – supporting sustainable economic activity in appropriate locations and getting good value for money
- environmental impact
- accessibility – improving access to everyday facilities for those without a car and reducing community severance.

Land use planning plays a central role in delivering sustainable development. The publication of PPG13 in 1994 was a major step towards planning land uses and transport together.

(ii) PPG7 (revised) The Countryside – Environmental Quality and Economic and Social Development (February 1997)

The revision replaces the 1992 version of PPG7. The main changes include the following:

- taking account of the White Paper Rural England, and of PPGs published since 1992
- advice on achieving good quality development and respecting the character of the countryside
- re-state and clarify policy on protecting the best agricultural land
- advice on local countryside designations and on the planning implications of Rural Development Areas and European Union Objective 5(b) areas.

(iii) RPP11 Regional Planning (Public Consultation Draft, February 1999)

This draft document places greater responsibility on regional planning bodies, working with the Government Offices and regional stakeholders, to resolve planning issues at the regional level through

the production of draft Regional Planning Guidance (RPG). The guidance strengthens the role and effectiveness of RPG by advising on, amongst other things:

- the need for greater regional focus concentrating on strategic issues
- the adoption of a "spatial" strategy which extends beyond land-use issues
- the incorporation of an integrated transport strategy for the region.

The preparation of a regional transport strategy is an integral part of RPG and is of key importance to achieving integration between land use planning and transport. Regional priorities for transport investment and management, across all modes, to support the regional strategy, will form part of the transport strategies. This will include the role of trunk roads and local highway authority roads of regional or sub-regional significance. The objectives set for the spatial strategy for the region, and the environmental, economic and social impacts of integrated planning and transport options will be critical to developing the regional transport strategy. Broad strategic options should be identified, such as the regeneration of an area through improved transport accessibility.

(iv) A Sustainable Development Strategy for the South East – SERPLAN, December 1998.

SERPLAN submitted its last advice to the Secretary of State for the Environment, *A New Strategy for the South East* in September 1990. This sought to address many of the problems that still exist today, notably increasing traffic congestion and pressure on green field sites for development. It was recognised then, that there were already deprived areas emerging within the south east which afforded the opportunity for widespread regeneration, including the Thames Gateway (then known as the East Thames Corridor).

The SERPLAN strategy published in December 1998 provides a core strategy for the region and sets out policies relating to six themes:

- Environmental enhancement and natural resource management
- Encouraging economic success
- Opportunity and equity
- Regeneration and renewal
- Concentrating development
- Sustainable transport

The plan sees a future where transport investment is more closely aligned to development provision. To achieve a more sustainable pattern of movement in the region, the strategy seeks to encourage more self-contained communities where individuals have the ability to access jobs, services and facilities locally. It recognises that, if road traffic continues to grow at current rates, businesses will have increasing difficulties moving goods and providing services, with serious economic consequences. The maintenance and management of the existing networks is required to enable more efficient use. Road improvements should be focused on strategic pressure points and conceived within the context of the overall management of car travel to reduce its growth.

The main aim of the strategy is to produce a more sustainable pattern of development, movement and economic activity. It is a spatial strategy which seeks regeneration and renewal of the less favoured parts of the region, concentrates development in urban areas and creates a pattern of development less

reliant on the use of the car. There needs to be a delicate balance between not stifling growth, developing a sustainable economy and protecting the environment.

Priority Areas For Economic Regeneration (PAERs) are identified in the strategy, including the Thames Gateway, which is seen as having great economic potential. In PAERs emphasis is on making existing and prospective economic development sites more accessible and improving internal non-car movement through local packages and mass transport provision.

The strategy states that environment and countryside designations of "intrinsic quality" at the international and national level (including Ramsar sites, SSSIs, SPAs etc) will continue to be strongly protected, consistent with national and international policy and legal obligations.

Specific policies are contained within the strategy. Those of direct relevance to the proposed road scheme are included in Appendix B.

(v) A Better Quality of Life – A Strategy for Sustainable Development for the UK, May 1999

The Government's White Paper provides a strategy for sustainable development in the UK and identifies priority areas for action and indicators and targets to measure progress. Sustainable development is described in its simplest terms as 'a better quality of life for everyone, now and for generations to come'. The strategy states that new approaches will be required for travel, living and working. Road traffic will be used as one of the indicators that sustainability is being achieved. The Government has also developed a new approach to roads appraisal. Schemes and other projects are assessed against criteria of environmental impact; safety; economy; accessibility (eg to public transport services) and integration with land use and other transport proposals and policies.

The Government stresses that we need good public transport, well maintained roads and better conditions for cyclists and pedestrians. However, one of the key issues is breaking the link between rising prosperity and increased travel, mainly by car.

The White Paper summarises the main points contained in the Government's White Paper 'A New Deal for Transport' and states that a new commission for Integrated Transport will advise on targets for road and traffic and public transport in order to achieve sustainable levels.

(vi) Swale Borough Local Plan

Modifications to the Swale Borough Local Plan, following the Inspector's Report, are due to be published in July 1999, and were therefore, not available for this addendum. However, information on recent developments concerning the local plan has been informally provided by Swale Borough Council, and is summarised below.

The levels of development in the local plan and the timing of their provision were drawn up in the anticipation that the second Swale crossing would be provided by 2001. The delay caused by the roads review has been taken into account by the Local Plan Inspector in his consideration of objections to the Plan. In particular the Inspector identified a shortfall in housing provision due to the lack of a second Swale crossing. "In the case of Sheppey, the shortfall results mainly from restrictions on strategic sites prior to the construction of the Iwade to Queenborough Improvements of the A249 including the second Swale crossing. Alternative sites on the Island would pose the same

problems in relation to highway capacity and replacements on the mainland would not be compatible with the objective of balancing housing and employment development in a sustainable manner.”

The development strategies for both Sheppey and Sittingbourne are heavily dependent on the provision of new and improved road infrastructure.

Sheppey (A249 improvements and Rushenden link road)

“The housing and employment requirements for the Sheppey Planning Area can only be fully provided for if the A249 Iwade to Queenborough Corner Improvement Scheme including the provision of a second Swale crossing is completed. A new developer funded link road (Rushenden Road link) is then proposed to be provided giving direct access from the existing Rushenden industrial estate direct to the A249. This will take industrial traffic out of the residential areas and historic core of Queenborough, and allow for a wider variety of uses to be permitted. New and expanded uses in this area are currently limited on highway grounds.”

Sittingbourne (A249 improvements; Milton and Kemsley Distributor Road (MKDR) and Northern Distributor Road (NDR))

“As with Sheppey, the housing and employment requirements for the Sittingbourne Planning Area can only be fully provided if the second Swale crossing is in place. Levels of development are constrained by the need to increase the highway capacity between the mainland and the Isle of Sheppey.”

Table B.2 in Appendix B provides a summary of the development opportunities on Sheppey, and their relationship with the proposed road improvement.

4 Conclusions

The original baseline information used for the original analysis has remained largely unchanged, and as such the conclusions therefore remain the same. Where changes have occurred, these have largely been the result of revised methodologies or changes in policy. These have been assessed against the original analysis and no changes in the original conclusions have been found. Where necessary, additional surveys will be carried out prior to construction and a continuing dialogue will be maintained between the interested parties.

Appendix A Air Quality

- 1) NETCEN map of PM₁₀ concentrations (see following page)
- 2) Data from Kent reports

Summary of measured PM₁₀ data extracted from the Kent Air Quality Monitoring Network Monthly Reports for 1999: rural and background sites

	Jan		Feb		March		April	
	Running 24 hour values							
	max	ave	Max	ave	max	ave	max	ave
Luton background	30	12	26	13	14	24	38	13
Sevenoaks background	32	15	30	16	43	20	N/a	N/a
Ashford rural	25	15	35	17	40	18	39	17
Stoke rural	31	16	31	18	38	20	53	19
Average		14.5		16		20.5		16.3
Overall average = 16.8								

Appendix B Policies and Plans

Table B.1: Relevant SERPLAN Policies

Policy Number	Policy	Comments
EE2	The quality of the rural environment should be maintained and enhanced, including conserving countryside character, while securing necessary change to meet the economic and social needs of local people and visitors. Priority should be given to protecting areas designated as having intrinsic environmental quality at international, national or strategic level to ensure no net loss or damage by development...	The alignment of the new road is such that encroachment into, SSSI and designated areas is minimised, and compensation land is provided.
ES3	Priority should be given to those parts of the region which are less prosperous or have suffered significantly from industrial restructuring. Particular emphasis should be given to those areas identified as Priority Areas for Economic Regeneration under policy RR5.	The Isle of Sheppey is included in a PAER.
RR5	In order to address strategic spatial inequalities around the region, priority should be given to actively supporting economic regeneration and renewal in areas suffering from one or more of the following: unemployment rates above the regional average; dependence on declining industries; peripherality and insularity..... At the regional level special priority should be given to the PAERs: the Thames Gateway; The aim is year on year to reduce the gap between unemployment rates in these areas and the regional average. This policy should be pursued within the overall sustainable policies of the strategy and taking due account of the considerable environmental wealth of these areas.	There are several development/regeneration opportunities dependant on the provision of a second Swale crossing.
ST1	Local authorities and all relevant players should pursue policies that act to reduce the growth in travel demand whilst maintaining the ability of the individual to access activities.	The second Swale crossing will increase accessibility and also provide improved facilities for pedestrians, cyclists and buses.

Policy Number	Policy	Comments
ST6	Government and public authorities should work with transport providers, property developers and financial institutions to secure a programme of transport investment which supports the aims and objectives of the regional strategy. The investment programme should consider the transport network as a whole and give priority to developing solutions at the local level.	The second Swale Crossing will contribute significantly to opportunities for regeneration of the area.
ST11	Transport policies should help to protect the environment from the adverse impacts of transport activity, whilst continuing to improve environmentally-friendly access to facilities	The alignment of the road along the line of the existing route, and the provision of compensation land, will minimise the adverse impacts on the surrounding environment.

Table B.2: Sheppey Development Opportunities

Site	Development Type	Size (ha/m ²)	Dependence on Crossing	Planning Status	Swale Borough Council Comment
Sheppey Planning Area Lappel/Sheerness Port, Sheerness	Employment (B2/B8)	86ha 16,000 m ² (B2) 140,000m ² (B8) 1,900m ² (A2/B1)	Direct	SW/95/101 Case 596 resolution to grant planning permission. Identified in local plan as site for which planning permission has been agreed.	Condition – limits development to no more than 10,000 m ² (B2) and 50,000 m ² (B8) in advance of second Swale crossing. There are doubts whether this application will be pursued. The ports long term intentions for this area do however broadly accord with this type and level of development. Later permissions have been granted for one new berth, an extension to an existing berth plus construction of a large cold store facility (6550m ²). When assessing traffic impact considerations however it is important to note that the passenger ferry business ceased operation in December 1996.
Neatscourt, Queenborough	Employment (B2/B8)	64ha 36,000m ² (B2) 54,000m ² (B8)	Direct	SW/95/100 Case 15383 Resolution to grant planning permission. Identified in local plan as site for which planning permission has been agreed.	Condition – no development in advance of provision of the second Swale crossing, with the exception of the existing car depot and a 6ha site immediately to the south of the car depot. Condition required by Highway Authority.

Site	Development Type	Size (ha/m ²)	Dependence on Crossing	Planning Status	Swale Borough Council Comment
Minster – Thistle Hill	Housing	1000 units	Direct	SW95/102 Case 12483 Outline planning permission granted for whole site. Subsequent approval of reserved matter granted for two phases of housing totalling 163 units.	Condition – no more than 340 units to be constructed and occupied prior to the provision of the second Swale crossing. Condition required by Highway Authority.
Minster – Kingsborough	Housing	150 units	Direct	SW95/102 Case 12483 Outline planning permission granted for whole site. Subsequent approval for first phased of housing 60 units.	Condition no more than 60 dwellings to be constructed and occupied prior to the provision of the second Swale crossing. Condition required by Highway Authority.
Sittingbourne Planning Area Ridham, Kemsley	Employment	120ha 280,000m ² (B2/B8)	Direct	SW95/95/99 – Case 12481 Resolution to grant planning permission. Identified in local plan as site for which planning permission has been agreed.	Conditions limit amount of development prior to second crossing. Conditions required by Highway Authority.

A249 (wade Bypass to Queenborough Improvement
Addendum to Environmental Statement

Mott MacDonald

Site	Development Type	Size (ha/m ²)	Dependence on Crossing	Planning Status	Swale Borough Council Comment
North of Ridham Avenue, Kemsley	Housing	285 units	Direct/ indirect	Outline planning permission.	Development is dependent on the northern section of the Milston and Kemsley Distributor Road being provided.

Appendix C Revised Framework Tables

Group 1 : Local People and their Communities

Sub-group	Effect	Unit	Proposed scheme	Do minimum	Comments
Residential Properties	Demolition	Number	1	No Change	Barrowgate, Queenborough Junction
	Visual Impact of road	Number adversely affected:	Year 1	No Change	Decrease in visual intrusion from year 1 to year 15 owing to maturing of planting.
			0 5 39	Year 15 0 4 5	
Visual Impact of bridge	Visual Impact of road	Number beneficially affected:	Year 1	No Change	Benefit increases from year 1 to year 15 as planting matures.
			0 15 9	Year 15 8 7 45	
	Visual Impact of bridge	Number affected:	Year 1	No Change	Bridge assessed as neutral; structure would be of a high quality aesthetic design, although traffic would be visible.
	Substantial Moderate Slight	1 0 53	Year 15 1 0 53		

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments	
			Year 1	Year 15			
Residential Properties	Noise dBL _{Ain} 18hr	Number of properties experiencing an increase of more than					
		1 < 3	1	81	378		
		3 < 5	1	0	0		
		5 < 10	0	1	0		
		10 < 15	0	0	0		
	> 15	0	0	0			
			Number of properties experiencing a decrease of	Year 1	Year 15		
			1 < 3	60	1	0	
			3 < 5	1	0	0	
			5 < 10	2	2	0	
		10 < 15	4	9	0		
		> 15	5	0	0		
	Severance		(a) none (b) none		No Change		
	(a) relief to existing severance (b) imposition of new severance						
	Disruption during construction		20 properties within 100 m of the site, which would be slightly affected.	None	No Change		
	Properties affected by land take	Number	None	N/A	No Change		

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments
			None	None		
Commercial Properties	Demolition	Number	None	None	No Change	
		Number adversely affected	Year 1	Year 15	No Change	Lady Hamilton public house
		Substantial	1	0		
	Moderate	0	1			
	Slight	0	0			
	Visual Impact of road	Number beneficially affected	Year 1	Year 15	No Change	Esso Garage
		Substantial	0	0		
		Moderate	0	0		
	Slight	1	1			
	Visual Impact of bridge	Number affected:	Year 1	Year 15	No Change	Lady Hamilton public house
Substantial		0	0			
Moderate		0	0			
Slight	1	1				
Noise dBL A10 16hr	Number of properties experiencing an increase of more than	Year 1	Year 15			
		1<3	0	0		
		3<5	0	0		
		5<10	0	0		
		10<15	0	0		
>15	0	0		Ambulance Station		

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments
		Number of properties experiencing a decrease of more than	Year 1	Year 15	N/A	
Commercial Properties		1<3	0	1		
		3<5	0	0		Esso Garage
		5<10	0	0		
		10<15	0	0		
		>15	0	0		
	Severance (a) relief to existing severance (b) imposition of new severance	- -	(a) none (b) Slight for Esso garage and the Lady Hamilton public house on Queenborough Road		No Change	
	Disruption during construction	-	Slight for Esso garage and the Lady Hamilton public house on Queenborough Road		No Change	
	Properties affected by land take	Number	None		N/A	
	Air Quality		Year 1	Year 15		Decrease owing to improved vehicle technology
		Nitrogen dioxide (NO ₂)	slight decrease	slight decrease	slight decrease	
		Carbon dioxide (CO ₂)	slight decrease	slight decrease	slight decrease	
		Hydrocarbons	slight decrease	slight decrease	slight decrease	
		Particulates	slight decrease	slight decrease	slight decrease	

Sub-group	Effect	Unit	Proposed scheme	Do minimum	Comments	
Community Facilities	Visual Impact of road	Number adversely affected:	Year 1	Year 15	No Change	* school ** bowling green
		Substantial	0	0		
		Moderate	1*	0		
		Slight	1**	0		
		Number beneficially affected:	Year 1	Year 15	No Change	school and bowling green
		Substantial	0	0		
		Moderate	0	0		
		Slight	0	2		
	Visual Impact of Bridge	Number affected:	Year 1	Year 15	No Change	Rushenden play area; The Glen; public open space, Minister; Sportsground, Waltham
		Substantial	0	0		
		Moderate	0	0		
		Slight	3	3		
	Noise dBL A10 16hr	Number of properties experiencing an increase of more than	Year 1	Year 15	4	* School ** Ambulance station *** Bowling Green **** Borough Hall
		1<3	1**	1**		
		3<5				
		5<10				
		10<15				
		>15				

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments
	Noise dBL AHW 18hr	Number of properties experiencing a decrease of more than	Year 1	Year 15	No Change	
Community Facilities		1<3	0	0		
		3<5	0	0		
		5<10	0	0		
		10<15	0	0		
		>15	0	0		
	Severance	-	(a) none		No Change	
	(a) relief to existing severance	-	(b) none			
	(b) imposition of new severance	-	None			
	Disruption during construction	-	None		No Change	
	Properties affected by land take	Number	None	N/A		
Farms	Air Quality	Nitrogen dioxide (NO ₂)	Year 1	Year 15	slight decrease	Decrease owing to improved vehicle technology
		Carbon dioxide (CO ₂)	slight decrease	slight decrease	slight decrease	
		Hydrocarbons	slight decrease	slight decrease	slight decrease	
		Particulates	slight decrease	slight decrease	slight decrease	
		Number	slight decrease	slight decrease	slight decrease	
	Demolition	Number	None		No Change	
	Visual Impact of Road	Number adversely affected:	Year 1	Year 15	No Change	Cowstead Farm Straymarsh Farm
		Substantial	0	0		
		Moderate	0	0		
		Slight	2	2		

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments
			Year 1	Year 15		
Farms	Visual Impact of Road	Number beneficially affected:			No Change	Neats Court Wallend
		Substantial	0	0		
		Moderate	0	0		
		Slight	2	2		
	Visual Impact of Bridge	Number affected:	Year 1	Year 15	No Change	* Straymarsh Farm, Slight; Cowstead Farm, Neats Court, Wallend; Parsonage Farm
	Substantial	0	0			
	Moderate	1*	1*			
		Slight	4	4		
	Noise dBL A10 15hr	Number of properties experiencing an increase of more than	Year 1	Year 15		
		1<3	1*	0	3*	* Straymarsh Farm Neats Court Cowstead Farm
		3<5	0	1*	0	
		5<10	0	0	0	
		10<15	0	0	0	
		>15	0	0	0	
		Number of properties experiencing a decrease of more than		Year 1	Year 15	
		1<3	0	0	0	Cowstead Farm Neats Court
		3<5	0	0	0	
		5<10	2	2	0	
		10<15	0	0	0	
		>15	0	0	0	

Sub-group	Effect	Unit	Proposed scheme		Do minimum	Comments
			Year 1	Year 15		
Farms	Air Quality	Nitrogen dioxide (NO ₂)	slight decrease	slight decrease	slight decrease	Decrease owing to improved vehicle technology
		Carbon dioxide (CO ₂)	slight decrease	slight decrease	slight decrease	
		Hydrocarbons	slight decrease	slight decrease	slight decrease	
		Particulates	slight decrease	slight decrease	slight decrease	
	Disruption owing to construction	-	Slight adverse effect on farm traffic movement		No Change	
Demolition of farm buildings	Number	Neatscourt sheep pens and storage building off Main Road demolished		No Change	Planning permission has been granted for new sheep pens elsewhere.	
Agricultural land take (grades 3 and 4)	hectares of land	20.1		N/A	None	
Severance (new)			Slight for two farmholdings Substantial for one small area at Queenborough		No Change	Area at Queenborough required for essential landscaping and noise mitigation New access points provided at Queenborough, Neats Court, Cowstead and under the new bridge.

Group 2 : Travellers

Sub-group	Effect	Units	Proposed scheme	Do minimum	Comments
Traveller Amenity	Disruption owing to construction	-	Temporary reduced visual amenity and heightened driver stress	No change	Site works and traffic management measures would temporarily interrupt free traffic flow
		-	Proposal would reduce driver stress to low throughout the design life (Year 1 to Year 15)	Existing high driver stress would deteriorate further	
	Driver stress	-	Improved view of landscape from high level bridge, providing moderate benefits	No change	
	Visual amenity	-	Temporary disruption to two footpaths, although access will be maintained	No change	Saxon Shore Way and Z511 (Cowstead corner)
(b) Pedestrians', Equestrians' and Cyclists' Amenity	Loss/diversion of route	m	None	No change	
	Severance (new)	-	Slight for one footpath (Z511) which is crossed by the route	No change	
	Traffic noise	-	Slight benefit, owing to transfer of most traffic on to new route	No change	Old road retained for pedestrians, equestrians and cyclists use
	Visual amenity	-	Introduction of planting will improve amenity at Queenborough junction	No change	

Sub-group	Effect	Units	Proposed scheme	Do minimum	Comments								
Traveller Safety (a) Vehicle Users	Change in casualties (positive figure indicates a reduction)	Number	<table border="1"> <thead> <tr> <th data-bbox="337 1061 363 1200">Low growth</th> <th data-bbox="337 887 363 1061">High growth</th> </tr> </thead> <tbody> <tr> <td data-bbox="363 1061 389 1200">Fatal: +9</td> <td data-bbox="363 887 389 1061">+6</td> </tr> <tr> <td data-bbox="389 1061 416 1200">Serious: +24</td> <td data-bbox="389 887 416 1061">-10</td> </tr> <tr> <td data-bbox="416 1061 442 1200">Slight: -264</td> <td data-bbox="416 887 442 1061">-511</td> </tr> </tbody> </table>	Low growth	High growth	Fatal: +9	+6	Serious: +24	-10	Slight: -264	-511	Reduction in safety as congestion increases	These figures indicate probable changes in casualties over the whole of the 30 year assessment period, if the national average rates distribution between groups apply to the scheme. They take no account of the safety implications of the detailed design of the scheme. Increases are due to the higher traffic volumes that could use the new road in the future as a result of the planned development on Sheppey.
Low growth	High growth												
Fatal: +9	+6												
Serious: +24	-10												
Slight: -264	-511												
(b) Pedestrians, Cyclists and Equestrians	Reduction in casualties	-	Slight benefit	Reduction in safety as congestion increases	Provision of the scheme would remove the majority of traffic from the existing road, making it a safer environment. Specific provision for cyclists/pedestrians at Queenborough junction and between Kingsferry bridge and Cowstead would also improve safety								

Group 3: The Cultural and Natural Environment

Sub-group	Effect	Units	Proposed scheme	Do Minimum	Comments
Cultural Heritage (a) Archaeological Sites	Landtake	ha	Slight incursion into periphery of one known SMR Saltern Site (approximately 0.01 ha)	No change	Further evaluation work would be carried out prior to construction
	Construction disturbance	-	None	No change	Neats Court Manor too distant to suffer construction effects
	Demolition	Nr	None	No change	
	Landtake	ha	None	No change	
	Severance (new)	-	None	No change	
(b) Listed Structures	Traffic noise	dBL _{A1018 hr}	Moderate benefit of 5 to 10 dBA for one listed building	Slight increase in noise levels as a result of increased traffic flow	Neats Court Manor
	Visual impact	-	Slight benefit owing to removal of through traffic	No change	
	Construction disturbance	-	None	No change	
	Landtake	ha	None	No change	
	Severance (new)	-	None	No change	
(c) Conservation Areas	Traffic noise	dBL _{A1018 hr}	None	No change	
	Visual impact	-	None	No change	
	Construction disturbance	-	None	No change	

Group 3: The Cultural and Natural Environment

Sub-group	Effect	Units	Proposed scheme	Do Minimum	Comments
Ecology	Construction disturbance	-	Potential temporary adverse effect on watercourses, grazing land and intertidal areas	No change	Strict code of construction practice would minimise risk
	Ecological effect:				
		(i) Permanent landtake	ha	13.46 ha of grazing marsh would be lost, of which 3.82 ha lies within the SSSI/SPA. A further 0.096 ha of intertidal mud from the SPA is also taken for the Swale Bridge positions	No change
(b) Invertebrates	(ii) Temporary landtake	ha	2.12 ha of intertidal mud and 0.5 ha of grazing marsh are required from the SPA to construct the Swale Bridge foundations	No change	
	(iii) Ditch culverting	m	570 m of open ditch will be culverted, of which 60 m lies within the SSSI/SPA. (Figure excludes existing roadside ditches)	No change	Equivalent lengths of open ditch would be recreated adjacent to the culverted lengths
	Construction disturbance	-	Potential temporary adverse effect on watercourses, grazing land and intertidal areas containing rare species	No change	Strict code of construction practice would minimise construction risk

Group 3: The Cultural and Natural Environment

Sub-group	Effect	Units	Proposed scheme	Do Minimum	Comments
(b) Invertebrates (cont)	Ecological effect	-	Slight adverse effect owing to landtake from habitats, predicted to be short-term as recolonisation should occur rapidly	No change	Mitigation includes habitat restoration on compensation land and creation of new ditch lengths. New drainage design would improve water quality by preventing road runoff entering the marshland system
(c) Ornithology	Construction disturbance	-	Slight adverse effect in short term owing to noise and construction personnel	No change	Disturbance is localised and predicted not to affect overall population size
	Ecological effect	-	Slight adverse effect in short term owing to loss of habitat and reduction in breeding success owing to increased noise levels	No change	Effects would be fully mitigated on compensation land area
Landscape	Construction disturbance	-	Slight adverse effect in short term	No change	
	Visual amenity	-	Moderate benefit in landscape character and quality owing to attractive bridge design	No change	New bridge would unify existing horizon presently degraded by industrial structures and pylons

Group 4 : Policies and Plans

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
General policies/economic development					
S3 II NK3 B21 BD3 P8	No change	No change	Substantial (B)	Substantial (B)	The scheme would facilitate economic development in the area by providing a better transport infrastructure.
S5	No change	No change	Moderate (B)	Moderate (B)	
G1	No change	No change	No change	No change	
S1 I	No change	No change	Slight (A)	Slight (A)	The scheme would encourage travel to and from the Isle of Sheppey, but would facilitate regeneration on the Island.
Nature Conservation, Agriculture and Landscape					
ENV12 E49	No change	Slight (A)	Moderate (B)	Moderate (B)	The scheme is designed to enhance the landscape of the area: extreme landscaping is proposed around Queensborough and the new bridge would be an attractive feature.

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

62333001.0018
ENR0249 Jan97wp

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
ENV1 ENV2 ENV3 BD6 Environment and development (KCC) Landscape and wildlife (KCC) Protection of AONBs (KCC) Agricultural land (KCC)	No change	No change	No change	No change	The design of the scheme would take in to account countryside, nature conservation and landscape and minimise effects whenever possible. The areas of land take would be minimised and possible compensation areas have been identified which would be suitable for habitat creation.
ENV4 ENV5 ENV6 E11 E16 S2 IV E30 Protection of SLAs (KCC) Protection of Ramsar sites (KCC) Protection of nature reserves (KCC) Protection of countryside (SBC) Protection of SLAs (SBC) Environmental protection (KCC) Protection of environment and historic sites (SBC) Protection of designated sites (SBC)	No change	No change	No change	No change	
Leisure and Recreation					
SR3 SR4 T20 IN43 R10 Protection of recreational areas (KCC) Development of recreational areas (KCC) Improvement of ROW network (SBC) ROW creation (SBC) Enhancement of Saxon Shoreway (SBC)	No Change	No change	No change	No change	There are two rights of way which would be crossed by the proposed scheme, but no diversion would be necessary

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
Heritage Sites					
E9	No change	No change	No change	No change	There are no Scheduled Ancient Monuments which would be affected by the scheme.
ENV18 E10		No change	No change	No change	The impact on archaeological sites would be minimised through selecting a route which passes alongside and close to the existing A249. Detailed field evaluation would be carried out prior to construction and an appropriate mitigation strategy formulated in consultation with English Heritage and the local authority.
Rivers/Flooding and Coasts					
NRS ENV10 E29	No change	No change	No change	No change	The Environment Agency have been consulted regarding drainage, and the scheme has been designed to minimise input on the coast.
Environmental Pollution					
ENV20 E5	Slight (B)	No change	Slight (B)	Slight (B)	There would be slight improvement in air quality due to improved vehicle technology.

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
NR3 E3 NR4 E4	No change	No change	Slight (B)	Slight (B)	The scheme would be carefully designed to ensure that groundwater and surface water flows are not affected, or at risk from pollution, via a new closed drainage system.
Minerals and Waste Disposal					
ENV25 W7 W8	No change	No change	No change	No change	Discussions are on-going with Kent County Council regarding the source and transfer of construction aggregates, to ensure compliance with KCC policies.
CA5 W1 CA16 CA18 CA17 W23	No change	No change	No change	No change	Discussions are on-going with Kent County Council regarding the source and transfer of construction aggregates, to ensure compliance with KCC policies.

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
Transport					
S7 T2 IN34 T3 T4 TS V IN35 IN2	No change	No change	Substantial (B)	Substantial (B)	<p>The proposed A249 Jwardt to Queenborough Improvement (including the new Swale crossing) is included in Table T1 of the Kent Structure Plan, under Department of Transport Priority 2, and therefore fully facilitates transport policies.</p> <p>The scheme has been identified in the Kent Structure Plan as being important for the economic development of the Isle of Sheppey. The likely impact on the areas of special environmental quality are assessed in this report, and the route will be sensitively designed to minimise the environmental impact, in accordance with the policy.</p>
Social and Community Effects					
T1 T11 IN17	No change	No change	Moderate (B)	Moderate (B)	<p>New crossing facilities would be provided at Queenborough, and the existing Swale crossing will be retained as a pedestrian and cycle facility, with a dedicated facility between the bridge and Cowstead Corner.</p>

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

Planning policies	Do minimum	Proposed Scheme			Comment
		Construction phase	Opening year	Design year	
E2 Development and noise levels (SBC)	No change	No change	No change	No change	Existing houses on the A249 will benefit as the new road will be moved further away, but others would be affected
T17 Serviced accommodation at Queenborough	No change	No change	No change	No change	The revised road layout will provide for this facility

Note: (A) - Adverse Effect; (B) - Beneficial Effect; (KCC) - Kent County Council; (SBC) - Swale Borough Council

02/11/2014 09:08
E:\P\13249_14037.rpt

Land Use Table

Existing land use	Area required permanently (ha)			Area required temporarily during construction (ha)	Comments
	Area for carriageway, footpaths and other hard surfaces	Area for verges, embankments, cuttings and other landscaping	Total area		
Existing highway landtake	-	-	11.055	-	
Permanent Water	0.091	0	0.091	0.999	Bridge piers
Intertidal mudflats	0.005	0	0.005	2.124	Bridge piers
Unimproved grazing marsh (agricultural grade 4)	6.152	7.306	13.458	0.464	Temporary area is for construction of pier foundations. Landscaping includes 1.908 ha for essential mitigation around Queenborough, and 0.368 ha for creation of new ditches.
Improved grazing land (agricultural grade 3)	3.250	3.319	6.648	0	
Total	9.577	10.625	31.257	3.587	Total area comprises 28.904 ha for scheme construction and 2.378 ha for essential mitigation.
Sub-division of Areas Included in Totals Above					
Designated site (ie grazing marsh and mudflats outside existing highway)	1.744	2.263	3.911	3.587	SSSI, Ramsar and SPA (includes 0.058 ha for creation of new details).
Area of redundant carriageway returned to agriculture	-	-	0.4	-	Ferry Road layby

Mitigation Table

Mitigation measure	Location, purpose and forecast benefit	Capital cost (£)	Forecast maintenance requirement, method and cost	Comments
Tree and Shrub Planting	Combined screening and ornamental planting around Queenborough Junction to enhance landscape character and quality	Total for scheme £310 000	Maintenance to ensure establishment for recommended minimum of 3 years. Management of planting thereafter to maintain high quality image. Estimated costs per annum: Year 1 : £60 000 Year 2 : £30 000 Year 3 : £20 000 Year 4 and thereafter : £ 20 000	Maintenance essential to achieve long term visual screening and visual quality. Costs include provision of informal recreation area within planted area south of Queenborough Junction.
Ecology: Grass Seeding	Seeding throughout the scheme on cutting and embankment slopes and verges. Creation of non-invasive low density sward which will allow colonisation by indigenous species. Total area = approximately 70 000 m ²	Total for the scheme £56 000	Specific long-term management required to promote species diversity through defined mowing regime. Estimated costs per annum: Year 1 : £15 000 Year 2 : £10 000 Year 3 : £8 000 Year 4 and thereafter : £6 000	Costs include soiling and bed preparation. Soils will be retained and spread in the same locations as part of the engineering works.

Mitigation measure	Location, purpose and forecast benefit	Capital cost (£)	Forecast maintenance requirement, method and cost	Comments
Ecology: Ditch Creation	Creation of new ditches adjacent to culverted sections to maintain the equivalent open water area for flora and fauna (approximately 570 m required).	Total for scheme £6 000	Slubbing out required every 5 years, equivalent to £200 per annum	Width and depth will vary to replicate the lengths that will be culverted.
Ecology: Compensation Land	Management of arable land remote from site as conservation area for flora, fauna and bird life, as compensation for that lost from the designated areas.	Costs are confidential at this stage	A management agreement would be prepared to cover such things as annual adjustment of water levels and adjustment of stocking densities.	Management techniques would be adjusted to suit the requirements of specific species, which would be agreed in consultation with conservation organisations.
Acoustic Barriers	Provision of 2.0 m high fencing, combined with earth mounding, around Quecborough junction. Barrier length = 300 m Bunding = 75 m ³	Total for scheme £65 000	Annual inspection of barriers and replacement of damaged panels. Estimated cost £500 per annum	Detailed design of barrier yet to be finalised.
Noise Insulation	Double glazing provision for 5 eligible properties to reduce noise levels.	Total for the scheme £8 000	none.	Subject to confirmation of eligibility.
Provision of closed drainage system (measures installed as part of engineering work)	Closed system would prevent runoff into high value marshland system and provide provision for safely dealing with accident spillage.	£1 200 000	Routine inspection of outfall flaps etc required. Estimated cost £1 000 per annum.	Regular maintenance essential to ensure proper functioning of tidal flaps.
Oil/petrol interceptors (measures installed as part of engineering works)	Interceptors installed as part of drainage system to extract oil-based pollutants prior to discharge into the Swale or West Minster Drain. Total number = 3	Total for scheme £50 000	£300 per annum for removal and disposal of separated pollutant contained in interceptors	Emptying of interceptors undertaken by tanker.

Mitigation measure	Location, purpose and forecast benefit	Capital cost (£)	Forecast maintenance requirement, method and cost	Comments
Balancing pond at Quenborough Junction	Provision of lined storage pond to store excess runoff prior to discharge into West Minsler Drain. Pond would incorporate aquatic planting to provide a landscape and ecological feature adjacent to the junction.	£75 000	Removal of contaminated silt to prevent excessive build up, and removal of excess vegetation. Estimated cost £200 per annum (slubbing out required every 5 years).	Marginal and aquatic planting costs included in figure for landscape works.
Archaeological Works	Trial trenching evaluation works required prior to construction to define extent of resource and aid formulation of any required rescue archaeology response.	£50 000	n/a	Mitigation works would be formulated in consultation with English Heritage. An archaeologist would also be present during construction works.

	Without scheme in year 2005
	With scheme in year 2005
	Without scheme in year 2020
	With scheme in year 2020

18 hour (0600 to 2400) annual average weekday traffic, high growth

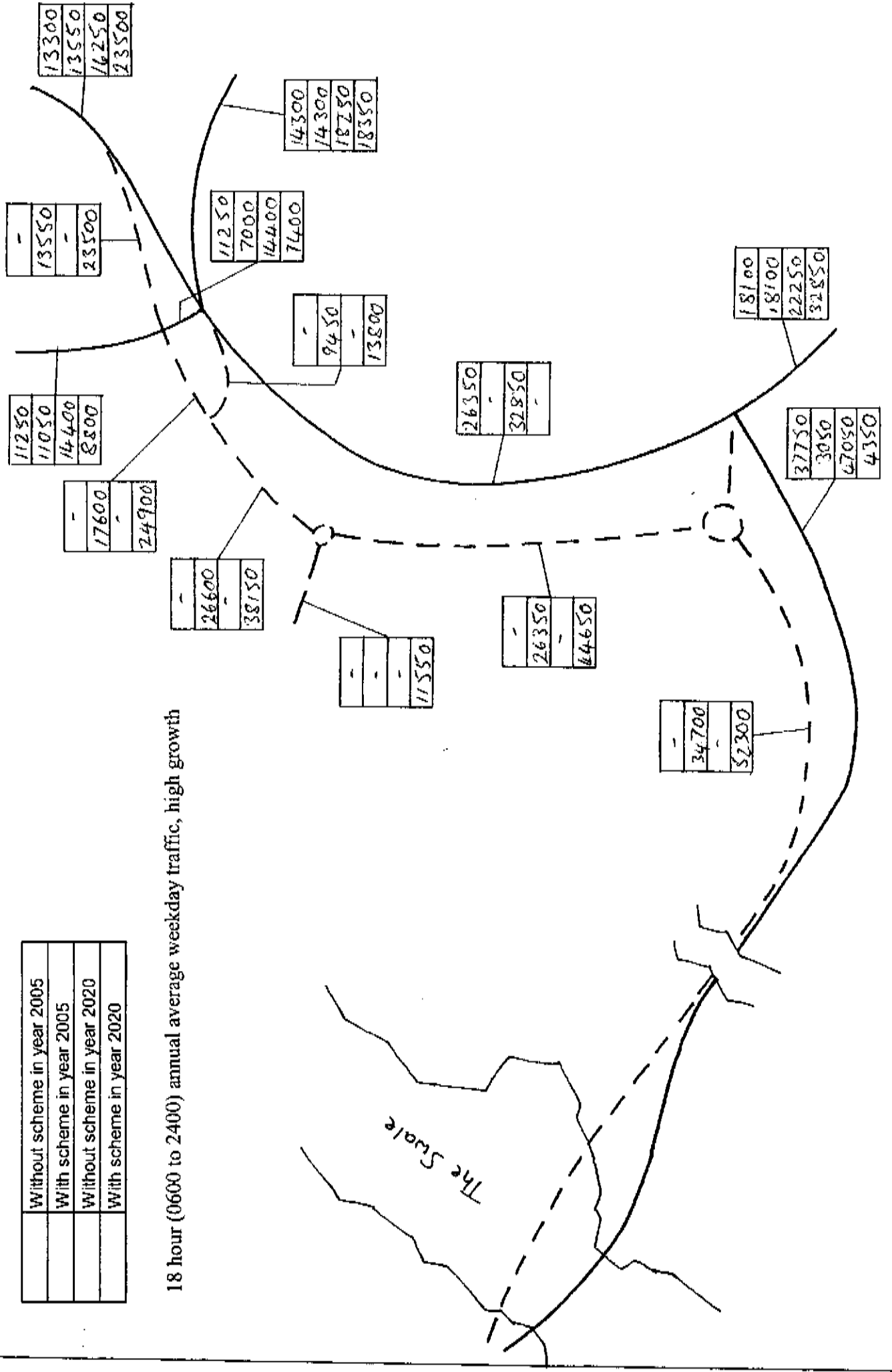
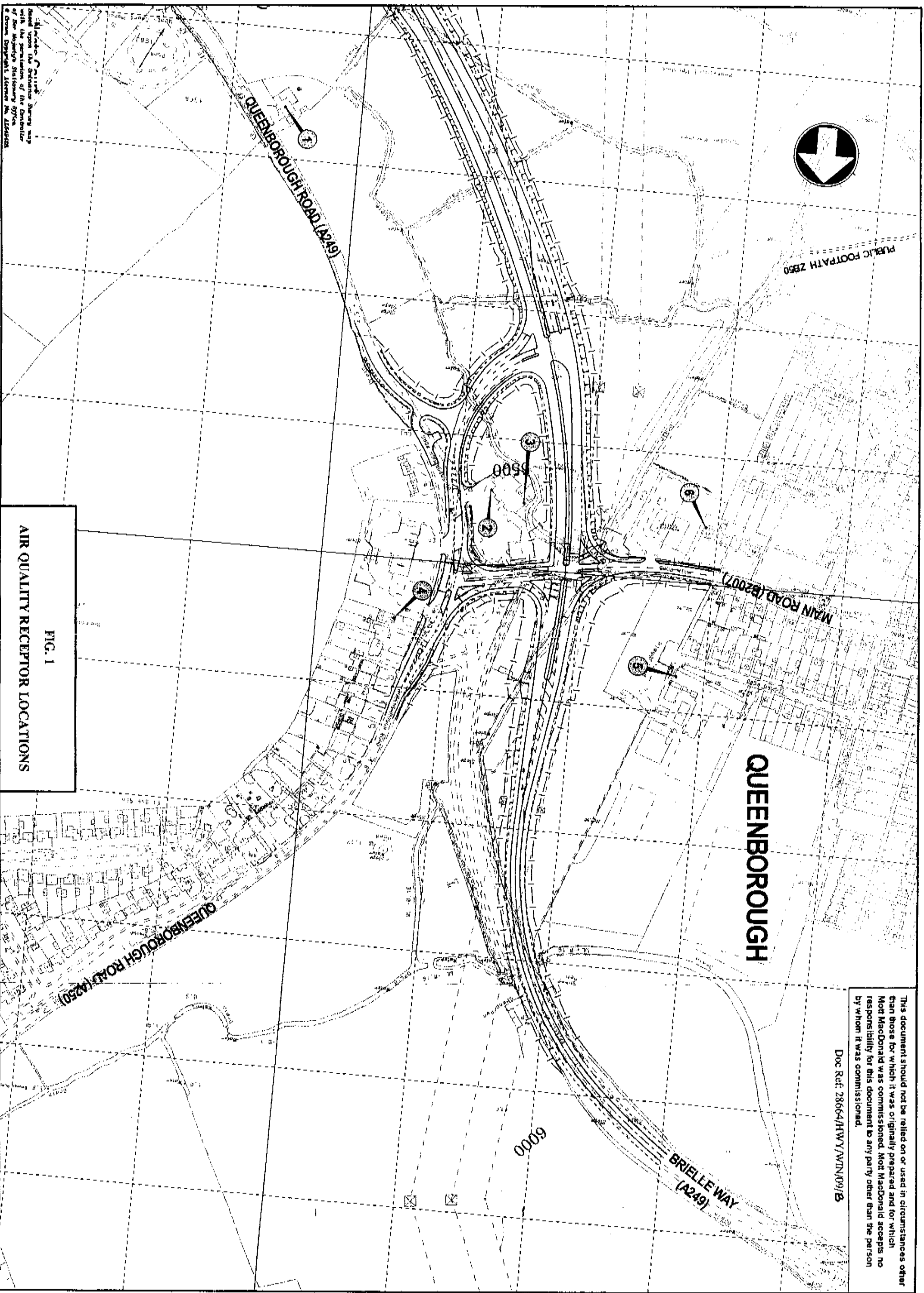


FIG 3. TRAFFIC FLOWS USED FOR THE NOISE CALCULATIONS



PUBLIC FOOTPATH ZB50

QUEENBOROUGH

BRIELLE WAY (A249)

6000

MAIN ROAD (B2007)

QUEENBOROUGH ROAD (A249)

QUEENBOROUGH ROAD (A250)

This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald was commissioned. Mott MacDonald accepts no responsibility for this document to any party other than the person by whom it was commissioned.

Doc Ref: 28664/HWV/WJN/09/B

FIG. 1

AIR QUALITY RECEPTOR LOCATIONS

Based upon the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationery Office © Crown Copyright. Licence No. 10004922

U:\28664\HWV\WJN\09\B\1\4\28664\CONV\46D5\252P8\WJIS\DCO_1\111.mxd

This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald was commissioned. Mott MacDonald accepts no responsibility for this document to any party other than the person by whom it was commissioned.

Doc Ref: 28664/HWY/WJN/09/B

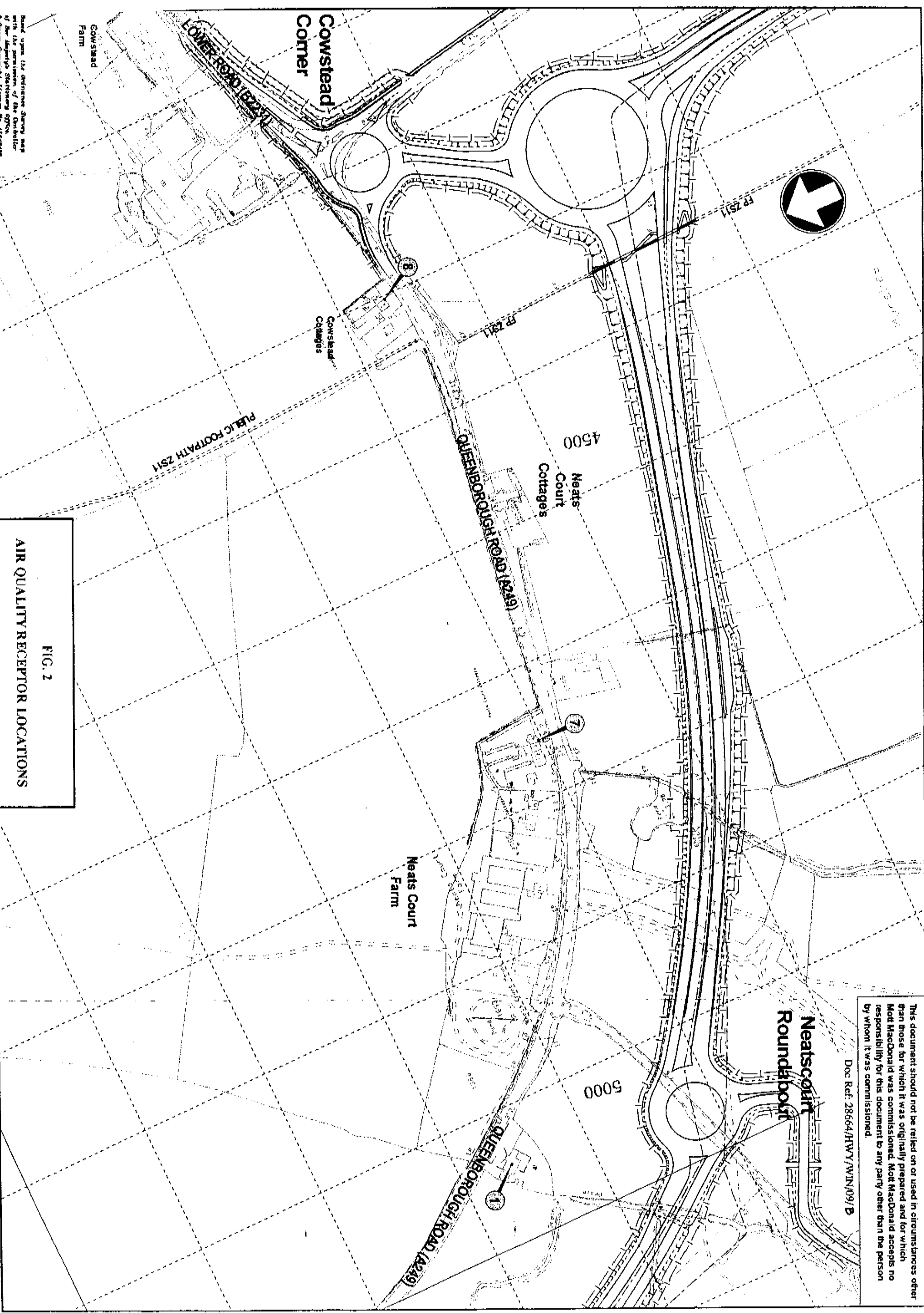
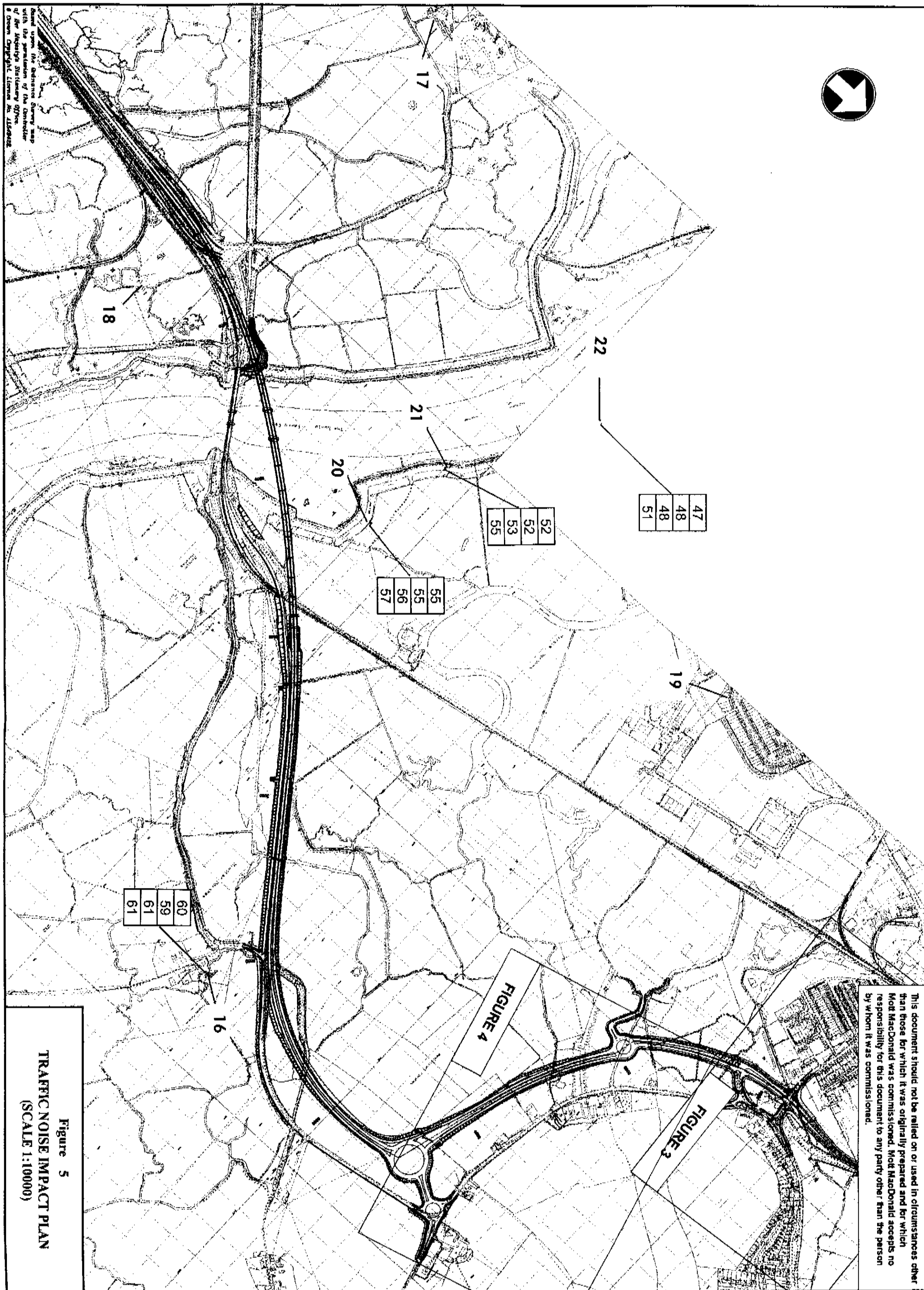


FIG. 2
AIR QUALITY RECEPTOR LOCATIONS

Based upon the definitive planning maps with the permission of the Controller of Her Majesty's Stationery Office & Crown Copyright Licence No. 12544422

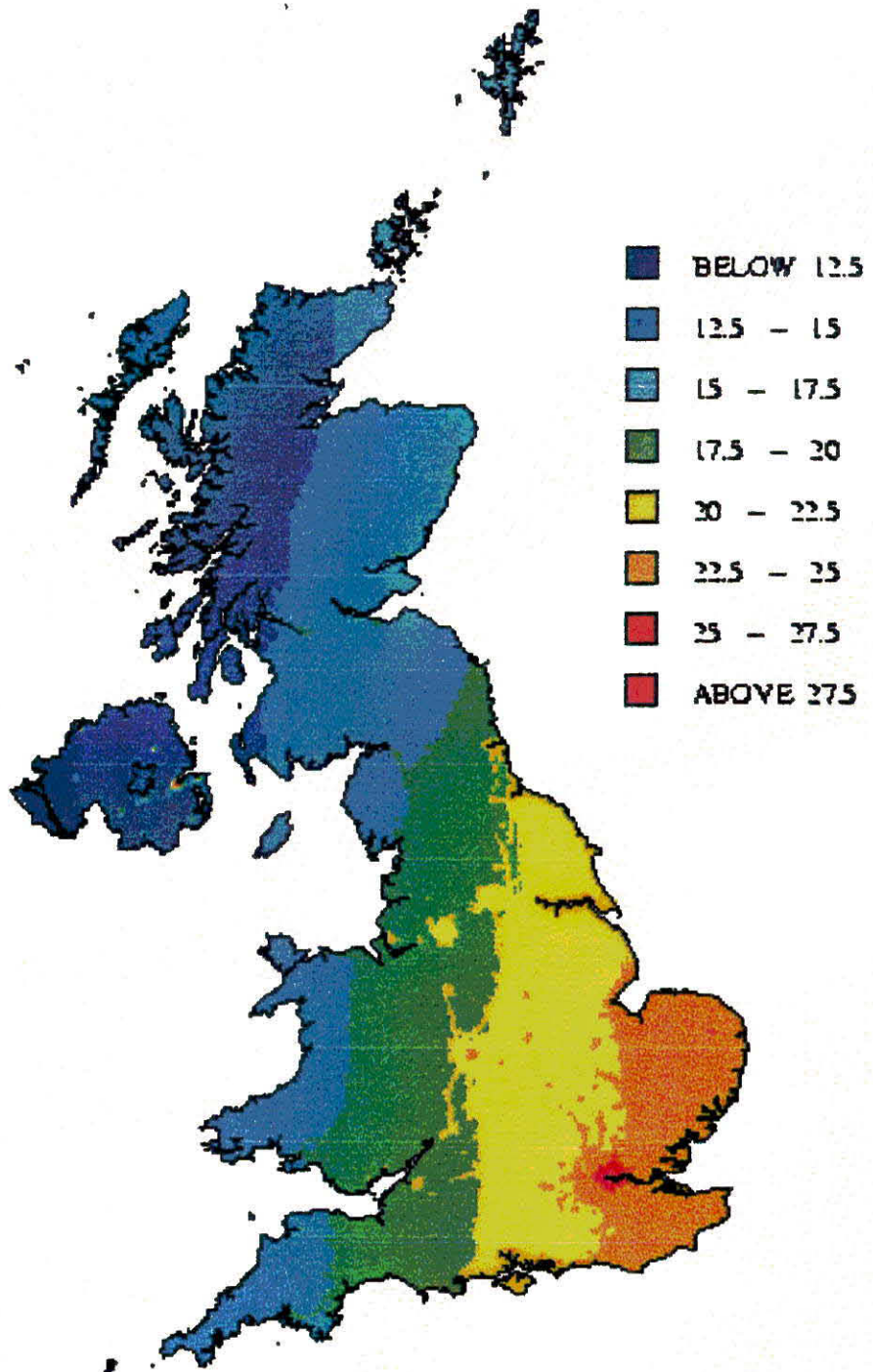


This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald was commissioned. Mott MacDonald accepts no responsibility for this document to any party other than the person by whom it was commissioned.

Figure 5
TRAFFIC NOISE IMPACT PLAN
(SCALE 1:10000)

Based upon the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. License No. 11569422

Figure 7a.
Estimated annual mean background PM10 concentration, 1996 ($\mu\text{g}/\text{m}^3$)
Ref NETCEN 34/10/97 30003001/RS UKUKN_PM105r



TRAFFIC NOISE IMPACT





KEY:

TRAFFIC NOISE LEVELS, dB L_{A10} (18 hour)





	Without scheme in year 2005
	With scheme in year 2005
	Without scheme in year 2020
	With scheme in year 2020

CHANGES IN TRAFFIC NOISE LEVELS 2005 WITHOUT SCHEME TO 2020 WITH SCHEME

INCREASES


	1 to 3 dB
	3 to 5 dB
	5 to 10 dB
	10 to 15 dB


DECREASES

	1 to 3 dB
	3 to 5 dB
	5 to 10 dB
	10 to 15 dB


Notes:

- (i) Noise levels calculated 1m from nearest building façade.
- (ii) Noise levels are rounded to the nearest dB. Noise change banding may not reflect the difference between the rounded figure quoted.

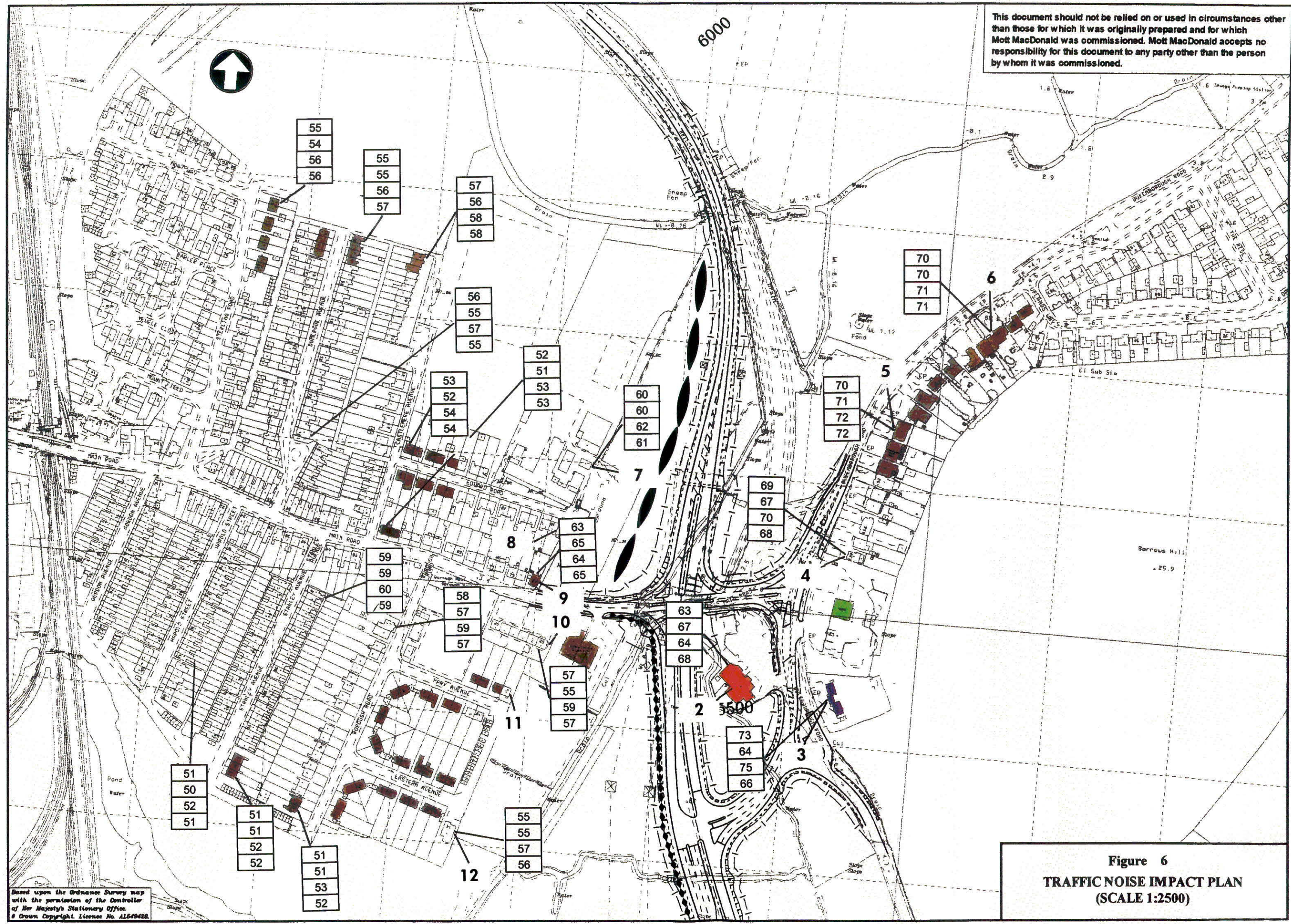
 Bund, varying in height to a maximum of 2m above carriageway level.

 Noise barrier, 2m above carriageway level.

CONSTRUCTION NOISE IMPACT

1  Sample construction noise receptors – see environmental statement for details

This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald was commissioned. Mott MacDonald accepts no responsibility for this document to any party other than the person by whom it was commissioned.



Based upon the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationary Office. © Crown Copyright. License No. AL549428.

Figure 6
TRAFFIC NOISE IMPACT PLAN
(SCALE 1:2500)

This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald was commissioned. Mott MacDonald accepts no responsibility for this document to any party other than the person by whom it was commissioned.

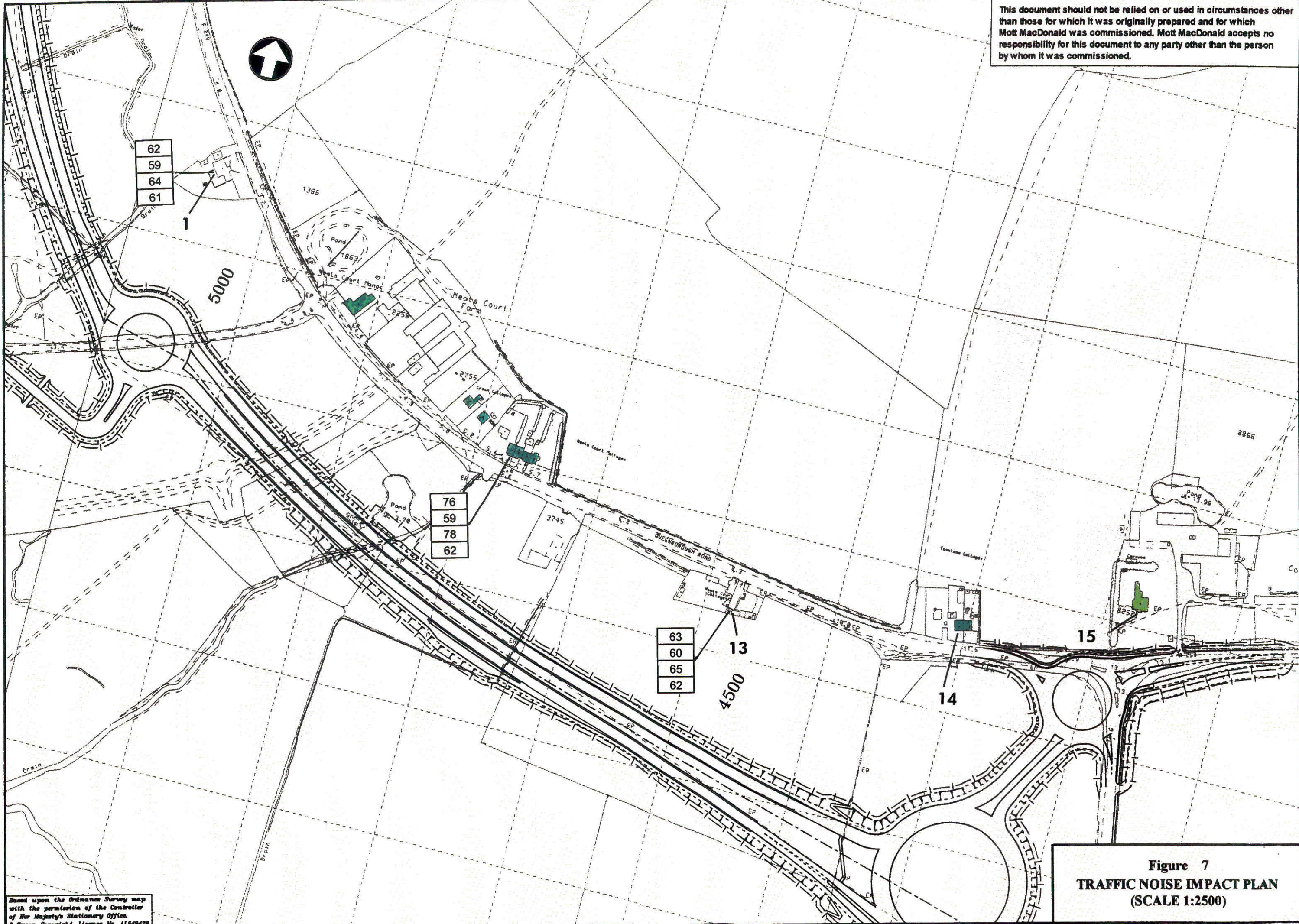


Figure 7
TRAFFIC NOISE IMPACT PLAN
(SCALE 1:2500)

Based upon the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright Licence No. AL649428