Report on the Review and Assessment of Air Quality Stage 2
For the London Borough of Hammersmith and Fulham
Under Part IV of the Environment Act 1995

March, 1999

CONTENTS

Executive summary to Stage 2 Review and Assessment report

The Review and Assessment of air quality is the initial part of the Local Air Quality Management (LAQM) process, and this report provides the second stage of the phased Review and Assessment. The intention of the phasing is to ensure that local authorities only undertake as much work as necessary, enabling those local authorities without air quality problems the opportunity not to use up valuable resources. Specific guidance notes have been provided by the DETR for undertaking the Review and Assessment.

This report provides the technical input to the second stage Review and Assessment for the London Borough of Hammersmith and Fulham. This stage requires the screening of the specific sources of emissions identified in the first stage review and assessment, with the aim to further review and assess whether there is a significant risk of any of the national air quality objectives for 2005 not being achieved. The first stage of the Review and Assessment indicated that further investigation was required for the following three pollutants: nitrogen dioxide, PM10, and sulphur dioxide.

The screening models used in the report were as recommended in the Government's guidance and the approach adopted was precautionary. The main screening methods used were as follows:

- for road transport sources, the revised Highway Agency's Design Manual for Roads and Bridges (DMRB) model
- for industrial sources, the Environment Agency's Guidance for Estimating the Air Quality Impact of Stationary Sources (GN24).

The results of the screening can thus inform the Council on the need or otherwise to proceed with the third stage of the review and assessment.

The results and findings of this report have highlighted that no further action need be undertaken for the following pollutant:

Sulphur dioxide

However the report suggests that further investigation is needed for the remaining pollutants identified in the first stage review and assessment for which air quality objectives for 2005 have been set, namely:

Nitrogen dioxide
PM10

The London Borough of Hammersmith and Fulham is therefore recommended to undertake the third stage review and assessment for these pollutants.

Table 4 Annual Average Daily Traffic flows (from LTS model)

JUNCTION DESCRIPTION 1	JUNCTION DESCRIPTION 2	AADT FLOW	ID FROM MAP
GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD/*BDY HAMMERSMITH & FULHAM	103928	1
HOLLAND PARK AV/WEST CROSS ROUTE	WESTWAY ELEVATED ROUNDABOUT	85373	2
GREAT WEST RD/HAMMERSMITH FLYOVER	HAMMERSMITH FLYOVER/TALGARTH RD	84555	3
WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	M41 SLIP RD/A40(M) FLYOVER/A40(M) SLIP	82947	4
SHEPHERD'S BUSH GREEN/UXBRIDGE RD	HOLLAND PARK AV/WEST CROSS ROUTE	81191	5
WESTWAY ELEVATED ROUNDABOUT	M41(EAST) SLIP RD/A40(M) SLIP	72182	6
M41 SLIP RD/A40(M) FLYOVER/A40(M) SLIP	WESTWAY/WALMER RD	68655	7
WESTWAY/WALMER RD	M41(EAST) SLIP RD/A40(M) SLIP	68655	8
HAMMERSMITH FLYOVER/TALGARTH RD	TALGARTH RD/GLIDDON RD	65135	9
GREAT WEST RD/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	62019	10
KING ST/QUEEN CAROLINE ST	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	59987	11
HAMMERSMITH BRIDGE RD/TALGARTH RD	KING ST/QUEEN CAROLINE ST	57773	12
HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BUTTERWICK/HAMMERSMITH BROADWAY	57351	13
WANDSWORTH BRIDGE/*BDY WANDSWORTH	DOWNMEAD RD/WANDSWORTH BRIDGE	56726	14
TALGARTH RD/GLIDDON RD	NORTH END RD/TALGARTH RD	54482	15
WESTWAY/WOOD LA/WESTWAY SLIP/A40(M) SLIP	WESTWAY ELEVATED ROUNDABOUT	54445	16
STARCH GREEN/GOLDHAWK RD/ASKEW RD	PADDENSWICK RD/GOLDHAWK RD	54326	17
PADDENSWICK RD/GOLDHAWK RD	GOLDHAWK RD/CONINGHAM RD	52679	18
WEST CROMWELL RD/WEIR N'BND SLIP	WEST CROMWELL RD/WARWICK RD	50890	19
NORTH END RD/TALGARTH RD	WEST CROMWELL RD/WEIR N'BND SLIP	50890	20
PUTNEY BRIDGE/*BDY WANDSWORTH	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	47732	21
TALGARTH RD/BUTTERWICK	TALGARTH RD/FULHAM PALACE RD	45672	22
WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	45572	23
EDITH ROW/KINGS RD/IMPERIAL RD	KINGS RD/*BDY HAMMERSMITH & FULHAM	45494	24
TALGARTH RD/FULHAM PALACE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	44487	25
WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	44309	26
HAMMERSMITH RD/*BDY HAMMERSMITH & FULHAM	HIGH ST, KENSINGTON/WARWICK RD	44277	27
NORTH END/NORTH END RD/HAMMERSMITH RD	HAMMERSMITH RD/*BDY HAMMERSMITH & FULHAM	44277	28
GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE	44063	29
GOLDHAWK RD/CONINGHAM RD	HAMMERSMITH GROVE/GOLDHAWK RD	40922	30
BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	40197	31
UXBRIDGE RD/BLOEMFONTEIN RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	40178	32
GOLDHAWK RD/STAMFORD BROOK RD	STARCH GREEN/GOLDHAWK RD/ASKEW RD	39719	33

Table 5 Predicted annual mean nitrogen dioxide concentrations using DMRB

Receptor Distance (m)	Link type	Junction Description 1	Junction Description 2	NO_2 Annual Mean Concentration
10	9	WANDSWORTH BRIDGE/*BDY WANDSWORTH	TOWNMEAD RD/WANDSWORTH BRIDGE	57
10	13	SHEPHERDS BUSH GREEN/GOLDHAWK RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	57
15	5	HAMMERSMITH FLYOVER/TALGARTH RD	TALGARTH RD/GLIDDON RD	56
10	9	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	56
10	13	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BUTTERWICK/HAMMERSMITH BROADWAY	54
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD/*BDY HAMMERSMITH & FULHAM	51
15	5	GREAT WEST RD/*BDY HAMMERSMITH & FULHAM	GREAT WEST ROAD/GREAT WEST RD	51
15	5	GREAT WEST RD/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	50
15	5	TALGARTH RD/GLIDDON RD	NORTH END RD/TALGARTH RD	50
10	9	PUTNEY BRIDGE/*BDY WANDSWORTH	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	50
10	13	SHEPHERD'S BUSH GREEN/UXBRIDGE RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	50
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	HAMMERSMITH FLYOVER/TALGARTH RD	48
10	9	TALGARTH RD/FULHAM PALACE RD	ST DUNSTANS RD/FULHAM PALACE RD	48
15	5	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	47
10	9	FULHAM PALACE RD/LILLIE RD	ST DUNSTANS RD/FULHAM PALACE RD	47
10	9	JERDAN PL/FULHAM RD/FULHAM BROADWAY	HARWOOD RD/FULHAM BROADWAY	47
10	9	STARCH GREEN/GOLDHAWK RD/ASKEW RD	PADDENSWICK RD/GOLDHAWK RD	47
10	9	STAMFORD BROOK RD	PREBEND GARDENS/*BDY HOUNSLOW	47
15	11	KING ST/QUEEN CAROLINE ST	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	47
10	9	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	46
10	9	HYTHE RD/SCRUBS LA	SCRUBS LA/HIGH ST, HARLESDEN/HARROW RD	44
10	9	STAMFORD BROOK RD/BATH RD	BATH RD/TURNHAM GREEN TERRACE	44
10	13	HAMMERSMITH BRIDGE RD/TALGARTH RD	KING ST/QUEEN CAROLINE ST	44
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD SLIP/GREAT WEST RD	42
10	9	DAWES RD/NORTH END RD/JERDAN PL	JERDAN PL/FULHAM RD/FULHAM BROADWAY	42
10	13	TALGARTH RD/BUTTERWICK	TALGARTH RD/FULHAM PALACE RD	42
10	13	BUTTERWICK/HAMMERSMITH BROADWAY	TALGARTH RD/BUTTERWICK	42
10	9	HIGH ST, FULHAM/FULHAM RD	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	41
10	9	WOOD LA/SCRUBS LA/NORTH POLE RD	HYTHE RD/SCRUBS LA	41
10	13	GREAT WEST RD SLIP/GREAT WEST RD	GREAT WEST RD/HAMMERSMITH BRIDGE RD	41
15	11	TALGARTH RD/FULHAM PALACE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	40
10	9	EDITH ROW/KINGS RD/IMPERIAL RD	KINGS RD/*BDY HAMMERSMITH & FULHAM	39
10	9	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	PREBEND GARDENS/CHISWICK HIGH RD	39
10	13	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	SHEPHERD'S BUSH GREEN/UXBRIDGE RD	39
10	9	LILLIE RD/NORTH END RD	NORTH END RD/TALGARTH RD	38
10	9	HAMMERSMITH RD/BROOK GREEN	HAMMERSMITH RD/EDITH RD	38
10	9	NEW KINGS RD/WANDSWORTH BRIDGE RD	NEW KINGS RD/HARWOOD RD/KINGS RD	37
10	9	GOLDHAWK RD/STAMFORD BROOK RD	STAMFORD BROOK RD	37
10	13	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/GREAT WEST RD	37
10	9	NORTH END RD/FULHAM RD/NEW NORTH RD	JERDAN PL/FULHAM RD/FULHAM BROADWAY	36
Receptor	**Link type**	**Junction Description 1**	**Junction Description 2**	**NO_2 Annual Mean**

Table 6 Predicted 99th percentile of 24 hour rolling means PM10 concentrations using DMRB

Receptor Distance (m)	Link type	Junction Description 1	Junction Description 2	PM10 Concentration
10	9	WANDSWORTH BRIDGE/*BDY WANDSWORTH	TOWNMEAD RD/WANDSWORTH BRIDGE	120
10	13	SHEPHERDS BUSH GREEN/GOLDHAWK RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	118
10	13	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BUTTERWICK/HAMMERSMITH BROADWAY	110
15	5	HAMMERSMITH FLYOVER/TALGARTH RD	TALGARTH RD/GLIDDON RD	101
10	9	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	99
10	9	STARCH GREEN/GOLDHAWK RD/ASKEW RD	PADDENSWICK RD/GOLDHAWK RD	93
10	9	PUTNEY BRIDGE/*BDY WANDSWORTH	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	89
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD/*BDY HAMMERSMITH & FULHAM	88
15	5	GREAT WEST RD/*BDY HAMMERSMITH & FULHAM	GREAT WEST ROAD/GREAT WEST RD	88
15	5	GREAT WEST RD/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	87
10	13	SHEPHERD'S BUSH GREEN/UXBRIDGE RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	86
10	9	TALGARTH RD/FULHAM PALACE RD	ST DUNSTANS RD/FULHAM PALACE RD	84
15	5	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	83
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	HAMMERSMITH FLYOVER/TALGARTH RD	82
15	5	TALGARTH RD/GLIDDON RD	NORTH END RD/TALGARTH RD	82
10	9	FULHAM PALACE RD/LILLIE RD	ST DUNSTANS RD/FULHAM PALACE RD	81
10	9	JERDAN PL/FULHAM RD/FULHAM BROADWAY	HARWOOD RD/FULHAM BROADWAY	81
15	11	KING ST/QUEEN CAROLINE ST	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	81
10	9	STAMFORD BROOK RD	PREBEND GARDENS/*BDY HOUNSLOW	81
10	9	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	PREBEND GARDENS/CHISWICK HIGH RD	78
10	13	HAMMERSMITH BRIDGE RD/TALGARTH RD	KING ST/QUEEN CAROLINE ST	76
10	9	STAMFORD BROOK RD/BATH RD	BATH RD/TURNHAM GREEN TERRACE	76
10	9	HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	75
10	9	HYTHE RD/SCRUBS LA	SCRUBS LA/HIGH ST, HARLESDEN/HARROW RD	75
10	13	BUTTERWICK/HAMMERSMITH BROADWAY	TALGARTH RD/BUTTERWICK	74
15	5	GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD SLIP/GREAT WEST RD	73
10	13	TALGARTH RD/BUTTERWICK	TALGARTH RD/FULHAM PALACE RD	73
10	9	HIGH ST, FULHAM/FULHAM RD	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	72
10	9	DAWES RD/NORTH END RD/JERDAN PL	JERDAN PL/FULHAM RD/FULHAM BROADWAY	72
10	13	GREAT WEST RD SLIP/GREAT WEST RD	GREAT WEST RD/HAMMERSMITH BRIDGE RD	72
15	11	TALGARTH RD/FULHAM PALACE RD	HAMMERSMITH BRIDGE RD/TALGARTH RD	71
10	9	HAMMERSMITH RD/BROOK GREEN	HAMMERSMITH RD/EDITH RD	71
10	9	STAMFORD BROOK RD/BATH RD	PREBEND GARDENS/*BDY HOUNSLOW	71
10	9	LILLIE RD/NORTH END RD	NORTH END RD/TALGARTH RD	70
10	9	WOOD LA/SCRUBS LA/NORTH POLE RD	HYTHE RD/SCRUBS LA	70
10	9	EDITH ROW/KINGS RD/IMPERIAL RD	KINGS RD/*BDY HAMMERSMITH & FULHAM	70
10	9	NEW KINGS RD/WANDSWORTH BRIDGE RD	NEW KINGS RD/HARWOOD RD/KINGS RD	69
10	9	ASKEW RD/BECKLOW RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	69
10	13	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	SHEPHERD'S BUSH GREEN/UXBRIDGE RD	69
10	9	NORTH END/NORTH END RD/HAMMERSMITH RD	HAMMERSMITH RD/EDITH RD	68
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	68
Receptor	**Link type**	**Junction Description 1**	**Junction Description 2**	**PM10 Concentration**

Appendix 4 Table 7 Part A Industrial Sources near the LB of Hammersmith and Fulham

Company	NO_2 Annual Average Concentration	Impact Footprint Radius (m)	SO_2 99.9th Percentile Concentration	Impact Footprint Radius (m)	PM10 99.9th Percentile Concentration	Impact Footprint Radius (m)
Guiness Brewing Ltd.	0.00	2775	10.53	2850	0.61	5700
Guiness Brewing Ltd.	0.28	2640	81.50	2400	8.78	4800
Powergen Plc.	0.22	2520	22.14	2370	8.10	4740
London Underground Ltd.	0.37	2310	7.70	1350	0.70	2700

Appendix 4

Table 8: Description of Link Types and receptor distances used.

link_type	Road description	Receptor Distance
1	Motorway - 3 lanes or more	30
2	Motorway - 2 lanes	15
3	Motorway - 1 lane (usually a slip road)	10
4	Dual Carriageway - 3 lanes or more	30
5	Dual Carriageway - 2 lanes	15
6	Dual Carriageway - 1 lane	10
7	Single Carriageway - 3 lanes or more	15
8	Single Carriageway - 2 lanes	15
9	Single Carriageway - 1 lane	10
10	Single track road	10
11	One-way road - 4 lanes	15
12	One-way road - 3 lanes	15
13	One-way road - 2 lanes	10
14	One-way road - 1 lane	10
15	Bus only link	10

Distance (m)				
10	13	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/GREAT WEST RD	68
15	5	PADDENSWICK RD/GOLDHAWK RD	GOLDHAWK RD/CONINGHAM RD	67
15	5	GOLDHAWK RD/CONINGHAM RD	HAMMERSMITH GROVE/GOLDHAWK RD	67
10	9	NEW KINGS RD/MUNSTER RD	NEW KINGS RD/ALDERVILLE RD	67
10	9	DAWES RD/NORTH END RD/JERDAN PL	LILLIE RD/NORTH END RD	67
10	9	NORTH END RD/FULHAM RD/NEW NORTH RD	JERDAN PL/FULHAM RD/FULHAM BROADWAY	67
10	9	GOLDHAWK RD/STAMFORD BROOK RD	STARCH GREEN/GOLDHAWK RD/ASKEW RD	67
10	9	GOLDHAWK RD/STAMFORD BROOK RD	STAMFORD BROOK RD	67
15	5	WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	67
10	9	OLD OAK RD/EAST ACTON LA	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	67
10	9	NEW KINGS RD/MUNSTER RD	FULHAM RD/MUNSTER RD	66
10	9	FULHAM RD/MUNSTER RD	MUNSTER RD/DAWES RD	66
10	9	PARSONS GREEN LA/FULHAM RD	NORTH END RD/FULHAM RD/NEW NORTH RD	66
10	9	FULHAM PALACE RD/LILLIE RD	LILLIE RD/MUNSTER RD	66
10	9	LILLIE RD/MUNSTER RD	MUNSTER RD/DAWES RD	66
10	9	HARWOOD RD/FULHAM BROADWAY	FULHAM RD/*BDY HAMMERSMITH & FULHAM	66
10	9	WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	66
10	9	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	WHITE CITY STATION/WOOD LA	66
30	4	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	66
10	9	HIGH ST, FULHAM/FULHAM RD	FULHAM PALACE RD/LILLIE RD	65
10	9	DOWNMEAD RD/WANDSWORTH BRIDGE	EDITH ROW/KINGS RD/IMPERIAL RD	65
10	9	FULHAM RD/MUNSTER RD	PARSONS GREEN LA/FULHAM RD	65
10	9	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE	65
10	9	BUTTERWICK/HAMMERSMITH BROADWAY	HAMMERSMITH RD/BROOK GREEN	65
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	65
15	12	GREAT WEST RD/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	65
10	9	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	LARDEN RD/THE VALE	65
10	9	CHISWICK HIGH RD/CHISWICK LA NORTH	PREBEND GARDENS/CHISWICK HIGH RD	65
15	5	HAMMERSMITH GROVE/GOLDHAWK RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	64
10	9	HIGH ST, FULHAM/FULHAM RD	FULHAM RD/MUNSTER RD	64
10	9	DOWNMEAD RD/WANDSWORTH BRIDGE	NEW KINGS RD/ALDERVILLE RD	64
10	9	NEW KINGS RD/HARWOOD RD/KINGS RD	HARWOOD RD/FULHAM BROADWAY	64
10	9	STARCH GREEN/GOLDHAWK RD/ASKEW RD	ASKEW RD/BECKLOW RD	64
10	9	WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	64
10	9	PARSONS GREEN/NEW KINGS RD	KINGS RD/PARSONS GREEN/NEW KINGS RD	63
10	9	KINGS RD/PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/WANDSWORTH BRIDGE RD	63
10	9	NEW KINGS RD/HARWOOD RD/KINGS RD	EDITH ROW/KINGS RD/IMPERIAL RD	63
10	9	DAWES RD/NORTH END RD/JERDAN PL	NORTH END RD/FULHAM RD/NEW NORTH RD	63
10	9	LILLIE RD/NORTH END RD	LILLIE RD/*BDY HAMMERSMITH & FULHAM	63
10	9	KING ST/DALLING RD	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	63
10	9	GOLDHAWK RD/CONINGHAM RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	63
Receptor Distance (m)	**Link type**	**Junction Description 1**	**Junction Description 2**	**PM10 Concentration**
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	63

10	9	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	NEW KINGS RD/MUNSTER RD	62
10	9	PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/ALDERVILLE RD	62
10	9	KING ST/DALLING RD	KING ST/STUDLAND ST	62
10	9	DALLING RD/GLENTHORNE RD	STUDLAND ST/GLENTHORNE RD	62
10	9	DALLING RD/GLENTHORNE RD	PADDENSWICK RD/GOLDHAWK RD	62
10	9	HAMMERSMITH GROVE/GLENTHORNE RD	HAMMERSMITH GROVE/GOLDHAWK RD	62
10	9	GOLDHAWK RD/STAMFORD BROOK RD	VAUGHAN AV/*BDY HAMMERSMITH AND FULHAM	62
10	13	KING ST/STUDLAND ST	STUDLAND ST/GLENTHORNE RD	62
10	13	BEADON RD/HAMMERSMITH GROVE	KING ST/QUEEN CAROLINE ST	62
15	5	TALGARTH RD/BUTTERWICK	HAMMERSMITH FLYOVER/TALGARTH RD	61
10	9	DOWNMEAD RD/WANDSWORTH BRIDGE	NEW KINGS RD/WANDSWORTH BRIDGE RD	61
10	9	LILLIE RD/MUNSTER RD	LILLIE RD/NORTH END RD	61
10	9	MUNSTER RD/DAWES RD	DAWES RD/NORTH END RD/JERDAN PL	61
15	11	KING ST/QUEEN CAROLINE ST	KING ST/HAMMERSMITH BROADWAY	61
10	13	KING ST/HAMMERSMITH BROADWAY	KING ST/STUDLAND ST	61
10	13	STUDLAND ST/GLENTHORNE RD	BEADON RD/GLENTHORNE RD/BESDON RD	61
10	9	WOOD LA/DU CANE RD	DU CANE RD/OLD OAK COMMON LA/*BDY EALING	61
10	9	VAUGHAN AV/*BDY HAMMERSMITH AND FULHAM	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	61
10	13	HAMMERSMITH GROVE/GLENTHORNE RD	BEADON RD/HAMMERSMITH GROVE	60
10	13	BEADON RD/GLENTHORNE RD/BESDON RD	HAMMERSMITH GROVE/GLENTHORNE RD	60
10	13	BEADON RD/GLENTHORNE RD/BESDON RD	BEADON RD/HAMMERSMITH GROVE	60
10	9	TALGARTH RD/GLIDDON RD	GLIDDON RD/EDITH RD	59
10	9	GLIDDON RD/EDITH RD	HAMMERSMITH RD/EDITH RD	59
10	9	VALETTA RD/*BDY HAMMERSMITH & FULHAM	EMLYN RD/*BDY HAMMERSMITH & FULHAM	59
10	9	VALETTA RD/*BDY HAMMERSMITH & FULHAM	LARDEN RD/THE VALE	59
10	9	EMLYN RD/*BDY HAMMERSMITH & FULHAM	PREBEND GARDENS/*BDY HOUNSLOW	59
10	13	GLIDDON RD/EDITH RD	NORTH END RD/EDITH RD	59
10	9	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	HAMMERSMITH RD/BROOK GREEN	58
10	13	DALLING RD/GLENTHORNE RD	KING ST/DALLING RD	58
10	14	BEADON RD/HAMMERSMITH GROVE	KING ST/HAMMERSMITH BROADWAY	58

Distance (m)				Concentration
10	9	NORTH END/NORTH END RD/HAMMERSMITH RD	HAMMERSMITH RD/EDITH RD	36
15	5	WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	35
10	9	NEW KINGS RD/MUNSTER RD	FULHAM RD/MUNSTER RD	35
10	9	DAWES RD/NORTH END RD/JERDAN PL	LILLIE RD/NORTH END RD	35
10	9	ASKEW RD/BECKLOW RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	35
10	9	STAMFORD BROOK RD/BATH RD	PREBEND GARDENS/*BDY HOUNSLOW	35
10	9	HIGH ST, FULHAM/FULHAM RD	FULHAM PALACE RD/LILLIE RD	34
10	9	TOWNMEAD RD/WANDSWORTH BRIDGE	EDITH ROW/KINGS RD/IMPERIAL RD	34
10	9	FULHAM RD/MUNSTER RD	MUNSTER RD/DAWES RD	34
10	9	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	WHITE CITY STATION/WOOD LA	34
15	12	GREAT WEST RD/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	34
15	5	GOLDHAWK RD/CONINGHAM RD	HAMMERSMITH GROVE/GOLDHAWK RD	33
10	9	NEW KINGS RD/MUNSTER RD	NEW KINGS RD/ALDERVILLE RD	33
10	9	DOWNMEAD RD/WANDSWORTH BRIDGE	NEW KINGS RD/ALDERVILLE RD	33
10	9	PARSONS GREEN LA/FULHAM RD	NORTH END RD/FULHAM RD/NEW NORTH RD	33
10	9	FULHAM RD/MUNSTER RD	PARSONS GREEN LA/FULHAM RD	32
10	9	NEW KINGS RD/HARWOOD RD/KINGS RD	HARWOOD RD/FULHAM BROADWAY	32
10	9	FULHAM PALACE RD/LILLIE RD	LILLIE RD/MUNSTER RD	32
10	9	LILLIE RD/MUNSTER RD	MUNSTER RD/DAWES RD	32
10	9	HARWOOD RD/FULHAM BROADWAY	FULHAM RD/*BDY HAMMERSMITH & FULHAM	32
10	9	OLD OAK RD/EAST ACTON LA	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	32
30	4	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	WESTWAY SLIP/WESTWAY/A40(M) FLYOVER	32
15	5	PADDENSWICK RD/GOLDHAWK RD	GOLDHAWK RD/CONINGHAM RD	31
10	9	NEW KINGS RD/HARWOOD RD/KINGS RD	EDITH ROW/KINGS RD/IMPERIAL RD	31
10	9	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	HAMMERSMITH BRIDGE	31
10	9	BUTTERWICK/HAMMERSMITH BROADWAY	HAMMERSMITH RD/BROOK GREEN	31
10	9	GOLDHAWK RD/STAMFORD BROOK RD	STARCH GREEN/GOLDHAWK RD/ASKEW RD	31
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	31
15	5	HAMMERSMITH GROVE/GOLDHAWK RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	30
10	9	DAWES RD/NORTH END RD/JERDAN PL	NORTH END RD/FULHAM RD/NEW NORTH RD	30
10	9	STARCH GREEN/GOLDHAWK RD/ASKEW RD	ASKEW RD/BECKLOW RD	30
10	9	WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	30
10	9	CHISWICK HIGH RD/CHISWICK LA NORTH	PREBEND GARDENS/CHISWICK HIGH RD	30
10	9	HIGH ST, FULHAM/FULHAM RD	FULHAM RD/MUNSTER RD	29
10	9	PARSONS GREEN/NEW KINGS RD	KINGS RD/PARSONS GREEN/NEW KINGS RD	29
10	9	KINGS RD/PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/WANDSWORTH BRIDGE RD	29
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	29
10	9	PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/ALDERVILLE RD	28
10	9	DOWNMEAD RD/WANDSWORTH BRIDGE	NEW KINGS RD/WANDSWORTH BRIDGE RD	28
10	9	LILLIE RD/NORTH END RD	LILLIE RD/*BDY HAMMERSMITH & FULHAM	28
Receptor Distance (m)	**Link type**	**Junction Description 1**	**Junction Description 2**	**NO_2 Annual Mean Concentration**
10	9	DALLING RD/GLENTHORNE RD	STUDLAND ST/GLENTHORNE RD	28

10	9	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	LARDEN RD/THE VALE	28
10	13	BEADON RD/HAMMERSMITH GROVE	KING ST/QUEEN CAROLINE ST	28
10	9	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	NEW KINGS RD/MUNSTER RD	27
10	9	KING ST/DALLING RD	KING ST/STUDLAND ST	27
10	9	KING ST/DALLING RD	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	27
10	9	UXBRIDGE RD/BLOEMFONTEIN RD	WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	27
10	9	WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	27
10	9	LILLIE RD/MUNSTER RD	LILLIE RD/NORTH END RD	26
10	13	KING ST/STUDLAND ST	STUDLAND ST/GLENTHORNE RD	26
10	13	KING ST/HAMMERSMITH BROADWAY	KING ST/STUDLAND ST	26
10	13	STUDLAND ST/GLENTHORNE RD	BEADON RD/GLENTHORNE RD/BESDON RD	26
15	5	TALGARTH RD/BUTTERWICK	HAMMERSMITH FLYOVER/TALGARTH RD	25
10	9	MUNSTER RD/DAWES RD	DAWES RD/NORTH END RD/JERDAN PL	25
10	9	DALLING RD/GLENTHORNE RD	PADDENSWICK RD/GOLDHAWK RD	25
10	9	HAMMERSMITH GROVE/GLENTHORNE RD	HAMMERSMITH GROVE/GOLDHAWK RD	25
10	9	WOOD LA/DU CANE RD	DU CANE RD/OLD OAK COMMON LA/*BDY EALING	25
10	9	VAUGHAN AV/*BDY HAMMERSMITH AND FULHAM	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	25
15	11	KING ST/QUEEN CAROLINE ST	KING ST/HAMMERSMITH BROADWAY	25
10	13	BEADON RD/GLENTHORNE RD/BESDON RD	BEADON RD/HAMMERSMITH GROVE	25
10	9	GOLDHAWK RD/STAMFORD BROOK RD	VAUGHAN AV/*BDY HAMMERSMITH AND FULHAM	24
10	9	GOLDHAWK RD/CONINGHAM RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	24
10	9	TALGARTH RD/GLIDDON RD	GLIDDON RD/EDITH RD	23
10	9	GLIDDON RD/EDITH RD	HAMMERSMITH RD/EDITH RD	23
10	13	HAMMERSMITH GROVE/GLENTHORNE RD	BEADON RD/HAMMERSMITH GROVE	23
10	13	BEADON RD/GLENTHORNE RD/BESDON RD	HAMMERSMITH GROVE/GLENTHORNE RD	23
10	13	GLIDDON RD/EDITH RD	NORTH END RD/EDITH RD	23
10	9	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	HAMMERSMITH RD/BROOK GREEN	20
10	9	VALETTA RD/*BDY HAMMERSMITH & FULHAM	EMLYN RD/*BDY HAMMERSMITH & FULHAM	20
10	9	EMLYN RD/*BDY HAMMERSMITH & FULHAM	PREBEND GARDENS/*BDY HOUNSLOW	20
10	13	DALLING RD/GLENTHORNE RD	KING ST/DALLING RD	20
10	14	BEADON RD/HAMMERSMITH GROVE	KING ST/HAMMERSMITH BROADWAY	20
10	9	VALETTA RD/*BDY HAMMERSMITH & FULHAM	LARDEN RD/THE VALE	19

Table 4 Annual Average Daily Traffic flows (from LTS model)

JUNCTION DESCRIPTION 1	JUNCTION DESCRIPTION 2	AADT FLOW	ID FROM MAP
GREAT WEST RD SLIP/GREAT WEST RD	GREAT WEST RD/HAMMERSMITH BRIDGE RD	39264	34
BUTTERWICK/HAMMERSMITH BROADWAY	TALGARTH RD/BUTTERWICK	38891	35
NEW KINGS RD/MUNSTER RD	NEW KINGS RD/ALDERVILLE RD	38372	36
TALGARTH RD/FULHAM PALACE RD	ST DUNSTANS RD/FULHAM PALACE RD	36799	37
FULHAM PALACE RD/LILLIE RD	ST DUNSTANS RD/FULHAM PALACE RD	36799	38
JERDAN PL/FULHAM RD/FULHAM BROADWAY	HARWOOD RD/FULHAM BROADWAY	36263	39
GOLDHAWK RD/CONINGHAM RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	36075	40
NORTH END/NORTH END RD/HAMMERSMITH RD	HAMMERSMITH RD/EDITH RD	36067	41
WESTWAY/BLOEMFONTEIN RD/WESTWAY W'BND	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	35753	42
NEW KINGS RD/WANDSWORTH BRIDGE RD	NEW KINGS RD/HARWOOD RD/KINGS RD	35063	43
GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/GREAT WEST RD	35021	44
GREAT WEST RD/HAMMERSMITH FLYOVER	GREAT WEST RD SLIP/GREAT WEST RD	34917	45
UXBRIDGE RD/SHEPHERD'S BUSH GREEN	SHEPHERD'S BUSH GREEN/UXBRIDGE RD	34473	46
SHEPHERDS BUSH GREEN/GOLDHAWK RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	34055	47
LILLIE RD/MUNSTER RD	MUNSTER RD/DAWES RD	32589	48
HARWOOD RD/FULHAM BROADWAY	FULHAM RD/*BDY HAMMERSMITH & FULHAM	32575	49
FULHAM RD/*BDY HAMMERSMITH & FULHAM	FULHAM RD/GUNTER GROVE/FINBOROUGH RD	32575	50
HAMMERSMITH RD/BROOK GREEN	HAMMERSMITH RD/EDITH RD	32389	51
FULHAM PALACE RD/LILLIE RD	LILLIE RD/MUNSTER RD	32207	52
WESTWAY/WOOD LA/WESTWAY SLIP/A40(M) SLIP	WHITE CITY STATION/WOOD LA	32202	53
UXBRIDGE RD/SHEPHERD'S BUSH GREEN	WHITE CITY STATION/WOOD LA	32202	54
HAMMERSMITH GROVE/GOLDHAWK RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	32062	55
HIGH ST, FULHAM/FULHAM RD	PUTNEY BRIDGE APPROACH/HIGH ST, FULHAM	30926	56
HAMMERSMITH BROADWAY/SHEPHERD'S BUSH RD	BROOK GREEN(N SIDE)/SHEPHERD'S BUSH RD	30345	57
BUTTERWICK/HAMMERSMITH BROADWAY	HAMMERSMITH RD/BROOK GREEN	29458	58
SHEPHERD'S BUSH GREEN/UXBRIDGE RD	SHEPHERDS BUSH GREEN/GOLDHAWK RD	29053	59
WESTWAY/WOOD LA/WESTWAY SLIP/A40(M) SLIP	WOOD LA/DU CANE RD	28941	60
ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	LARDEN RD/THE VALE	28029	61
WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	CONINGHAM RD/CONNINGHAM RD/UXBRIDGE RD	27982	62
WORMHOLT RD/BECKLOW RD/UXBRIDGE RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	27982	63
NEW KINGS RD/HARWOOD RD/KINGS RD	EDITH ROW/KINGS RD/IMPERIAL RD	27882	64
WOOD LA/SCRUBS LA/NORTH POLE RD	WOOD LA/DU CANE RD	27780	65
HIGH ST, FULHAM/FULHAM RD	FULHAM RD/MUNSTER RD	27588	66

Table 4 Annual Average Daily Traffic flows (from LTS model)

JUNCTION DESCRIPTION 1	JUNCTION DESCRIPTION 2	AADT FLOW	ID FROM MAP
HAMMERSMITH GROVE/GLENTHORNE RD	HAMMERSMITH GROVE/GOLDHAWK RD	27260	67
TALGARTH RD/BUTTERWICK	HAMMERSMITH FLYOVER/TALGARTH RD	27160	68
HYTHE RD/SCRUBS LA	SCRUBS LA/HIGH ST, HARLESDEN/HARROW RD	26914	69
LILLIE RD/NORTH END RD	LILLIE RD/*BDY HAMMERSMITH & FULHAM	26815	70
UXBRIDGE RD/BLOEMFONTEIN RD	UXBRIDGE RD/SHEPHERD'S BUSH GREEN	26524	71
STAMFORD BROOK RD/BATH RD	BATH RD/TURNHAM GREEN TERRACE	26331	72
STAMFORD BROOK RD/BATH RD	PREBEND GARDENS/*BDY HOUNSLOW	26331	73
GREAT WEST RD/HAMMERSMITH BRIDGE RD	GREAT WEST RD SLIP/HAMMERSMITH BRIDGE RD	25933	74
VICTORIA RD/OLD OAK COMMON LA/OLD OAK LA	WULFSTAN ST/*BDY EALING	25709	75
WULFSTAN ST/*BDY EALING	DU CANE RD/OLD OAK COMMON LA/*BDY EALING	25709	76
FULHAM RD/MUNSTER RD	PARSONS GREEN LA/FULHAM RD	25553	77
PARSONS GREEN LA/FULHAM RD	NORTH END RD/FULHAM RD/NEW NORTH RD	25553	78
DALLING RD/GLENTHORNE RD	PADDENSWICK RD/GOLDHAWK RD	24638	79
KING ST/DALLING RD	KING ST/GOLDHAWK RD/HIGH ST, CHISWICK	23074	80
DU CANE RD/OLD OAK COMMON LA/*BDY EALING	WESTWAY W'BND/WESTWAY E'BND/OLD OAK RD	22759	81
GOLDHAWK RD/STAMFORD BROOK RD	VAUGHAN AV/*BDY HAMMERSMITH AND FULHAM	22318	82
KING ST/STUDLAND ST	STUDLAND ST/GLENTHORNE RD	22307	83
KINGS RD/PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/WANDSWORTH BRIDGE RD	22194	84
PARSONS GREEN/NEW KINGS RD	NEW KINGS RD/ALDERVILLE RD	22194	85
PARSONS GREEN/NEW KINGS RD	KINGS RD/PARSONS GREEN/NEW KINGS RD	22194	86
OLD OAK RD/EAST ACTON LA	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	22173	87
ASKEW RD/BECKLOW RD	ASKEW RD/UXBRIDGE RD/OLD OAK RD/THE VALE	22153	88
STARCH GREEN/GOLDHAWK RD/ASKEW RD	ASKEW RD/BECKLOW RD	22145	89
LILLIE RD/NORTH END RD	NORTH END RD/TALGARTH RD	21993	90
NEW KINGS RD/MUNSTER RD	FULHAM RD/MUNSTER RD	21875	91
HIGH ST, FULHAM/FULHAM RD	FULHAM PALACE RD/LILLIE RD	21387	92
WOOD LA/SCRUBS LA/NORTH POLE RD	HYTHE RD/SCRUBS LA	20698	93
FULHAM RD/MUNSTER RD	MUNSTER RD/DAWES RD	20426	94
STAMFORD BROOK RD	PREBEND GARDENS/*BDY HOUNSLOW	20365	95
GOLDHAWK RD/STAMFORD BROOK RD	STAMFORD BROOK RD	20338	96
BEADON RD/HAMMERSMITH GROVE	KING ST/QUEEN CAROLINE ST	20162	97
KING ST/HAMMERSMITH BROADWAY	KING ST/STUDLAND ST	20134	98
NORTH END RD/FULHAM RD/NEW NORTH RD	JERDAN PL/FULHAM RD/FULHAM BROADWAY	19942	99

Appendix 3 Table 4 Annual Average Daily Traffic flows (from LTS model)

JUNCTION DESCRIPTION 1	JUNCTION DESCRIPTION 2	AADT FLOW	ID FROM MAP
DALLING RD/GLENTHORNE RD	STUDLAND ST/GLENTHORNE RD	19891	100
M41 SLIP RD/A40(M) FLYOVER/A40(M) SLIP	WESTWAY ELEVATED ROUNDABOUT	19821	101

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1.0 Introduction

1.1 This is the Stage 2 Review and Assessment technical report for the London Borough of Hammersmith and Fulham, which assists with the local air quality management process as laid down by Part IV of the Environment Act 1995.

1.2 The Council has previously prepared the Stage 1 report [(1)]. It identified which of the relevant specified National Air Quality Strategy (NAQS) pollutants, as well as localities of concern for each, should be the focus of this second stage review and assessment.

1.3 The overall purpose of the Review and Assessment is to enable local authorities to appraise current and future air quality for their geographical area against the NAQS objectives of the Air Quality Regulations 1997 (see Appendix 1). The review and assessment follows a three stage phased approach and all local authorities are required to undertake the first stage. Local authorities should then only proceed to subsequent stages if necessary. The assessment requires air quality to be predicted for the year 2005 and assessed against the air quality objectives. If the results of this assessment are such that the objectives are unlikely to be met by the year 2005, the local authority is required to designate an Air Quality Management Area (AQMA) and prepare a written action plan.

1.4 The Stage 1 review and assessment report for the London Borough of Hammersmith and Fulham indicated the possibility of an exceedence of the NAQS objectives at the end of 2005. Hence the recommendations were that the Stage 2 review and assessment should proceed for the following NAQS pollutants:

- Sulphur Dioxide
- Nitrogen dioxide
- PM10

The aim of this Stage 2 report is therefore to provide a further screening of these pollutants only.

1.5 The DETR Pollutant - Specific Guidance (paragraph 1.9 of LAQM TG4 (98))[(2)] suggests that it is possible to proceed directly to a third stage of the review and assessment, without undertaking the second stage. It is however considered that this second stage report provides further useful screening, prior to undertaking a detailed third stage review and assessment.

2.0 Development of Review and Assessment

2.1 The above mentioned Guidance (paragraph 1.11 of LAQM TG4 (98)) advises that -

"The aim of the second stage review and assessment is to provide a further screening of pollutant concentrations in the local authority areas. It is not intended that it should provide an accurate prediction of levels of current or future air quality across the whole of the authority's area. The second stage does not require a local authority to estimate every area of exceedence within its locality for each pollutant in question or to estimate the geographical extent of potential exceedences."

2.2 The screening for the second stage therefore involves the selection of a number of locations, where the highest concentrations are likely. These need review and assessment as to whether there is a significant risk of the NAQS objective not being achieved. If the second screening stage predicts that the relevant air quality objective will not be achieved by the end of 2005, the Council will need to undertake a detailed and accurate third stage air quality review and assessment using detailed monitoring, modelling and emission inventories.

2.3 The Stage 2 must also have regard to locations where individuals are likely to be exposed over the averaging time of the prescribed objective, as follows (from para. 1.14 of LAQM TG4):

- For objectives with short averaging times (SO_2 and hourly NO_2) reviews and assessments should be focused on any non-occupational, near ground level outdoor location given that exposures over such short averaging times are potentially likely

- For objectives with longer averaging times (benzene, 1,3-butadiene, carbon monoxide, lead, PM10 and the annual objective for NO_2) reviews and assessments should be focused on the following near ground level outdoor non-occupational locations: background locations, roadside locations and other areas of elevated pollutants concentrations where a person might reasonably be exposed (e.g. in the vicinity of housing, schools or hospitals, etc) over the relevant averaging time of the objective.

2.4 The Pollutant Specific Guidance (LAQM.TG4 (98)) advises two alternative approaches to the second stage review and assessment, one based on monitoring data, and the other based on screening models. This report has mainly focused on the latter. The general approach adopted in this report is that of a precautionary approach, as required in the above Guidance.

2.5 The following main screening methods were used (in accordance with the Guidance):

- for road transport sources, the revised Highway Agency's Design Manual for Roads and Bridges (DMRB)[3] model
- for industrial sources, the Environment Agency's Guidance for Estimating the Air Quality Impact of Stationary Sources (GN24)[4].
- LAQM.TG4 (98) guidance was also used, most specifically for overlapping sources.

2.6 A brief outline of the screening methods is given below, with a summary of the LAQM.TG4 (98) guidance for Stage 2 given in Appendix 2:

3.0 DMRB Methodology

3.0.1 The DMRB method includes a simple methodology for estimating the concentrations of air pollutants in the vicinity of roads. This methodology has been used for many years as a screening tool, primarily in support of assessments of new road building projects. It consists of a number of tables which allow the user to input vehicles flows of heavy and light vehicles, vehicle speed and the year being considered. A series of look-up tables are used to correct for vehicle speed, the year and concentration calculations, to provide estimates of concentrations up to 200m from a road. The methodology is attractive as it implicitly includes the change in vehicle technologies year by year. The methodology has recently been updated as described below.

3.1 Revised Methodology

3.1.1 The Highways Agency has released a draft version of a revised methodology, and this provides the basis of the calculations made here. The most significant changes are:

- Revision of the emission factor database to reflect emerging emissions legislation;
- Direct application to the NAQS, with predictions over consistent time scales e.g. rolling 8 hour peak CO;

- The background concentrations are now considered separately, allowing the user to use the most relevant background data available e.g. from an air pollution monitoring network or pollution climate mapping;
- A single relationship is used for the variation of NO_2 with NO_X concentrations. Previously three different locations were considered: urban, suburban and rural.

3.2 Use of DMRB in Stage 2 Predictions

3.2.1 The data inputs have been taken from the LTS traffic model including the LGV and HGV daily flows, vehicle speed. Predictions have been made for the base year 2005. Background concentrations for 2005 have been calculated using a pollution climate mapping technique. This technique has been shown to produce very reliable background concentration estimates in London and has been used by SEIPH in detailed work for the DETR and GOL. The annual average background estimates have been combined with the annual average roadside predictions from the DMRB to derive the final estimated concentration.

3.2.2 Having calculated the total annual mean concentration, a series of correction factors are used to estimate concentrations required in the NAQS. These factors are given in the following table:

Table 1 Calculation of NAQS Concentrations Using DMRB

To get	Multiply	By
Maximum 8 hour mean CO (ppm)	Annual mean CO (ppm)	10
Annual mean benzene (ppb)*	Non methane hydrocarbon (ppb)	0.05
Annual mean 1,3-butadiene (ppb)	Benzene (ppb)	0.2
Annual mean NO_2 (ppb)	Derived from NO_X-NO_2 curve	
Peak hour NO_2 (ppb)	Annual mean NO_2	6
99^{th} percentile of 24 hour rolling mean PM10	Annual mean PM10	3

(Note* -The background benzene concentration (ppb) should be added after this calculation.)

3.3 In line with LAQM.TG4 for roadside locations, the DMRB methodology has been used where the public is likely to be exposed. In this instance it has been assumed, as a precautionary approach, that exposure arises at all roads (even though in reality there may be some instances where the public does not generally have access and therefore cannot be exposed over the relevant averaging time).

3.4 Details of traffic flows are given in the following Maps 1 and 1.1 on page 10 and also Table 4 in Appendix 3.

4.0 Environment Agency (GN 24) methodology

4.0.1 This guidance has been produced by the Environment Agency to provide a step by step paper based system for making the first estimates of the impacts of stationary pollution sources. It can be applied to emissions from existing or proposed industrial processes where the emissions are from elevated stationary sources i.e. stacks. The methodology is suitable for the screening necessary in Stage 2 of the Review and Assessment and the outputs have been used in the following ways:

- To judge the risk posed by industrial emission sources to the achievement of the NAQS objectives and to decide if more detailed modelling and analysis are warranted;

- To identify the approximate distance over which the air pollution impacts are likely to occur.

4.1 Accuracy of the Chart Method

4.1.1 The guidance contains a set of look-up charts, which use contours to summarise the results of a wide range of dispersion model release conditions. The charts are used to give the maximum ground level concentration and distance of occurrence from the industrial stack for the annual average, 99.9th and 100th percentiles of hourly averages. A comparison of the screening method with separate calculations indicates an overestimation of between 20-30%, which provides one of a number of the conservative approaches taken.

4.2 Description of the Screening Method

4.2.1 The process follows a series of steps and an overview of these is as follows:

- **Step 1, Case Definitions;** Estimates where stack impacts are required and the collation of basic geographical and engineering information for each source. Also includes site characteristics such as operational parameters and mass emission rates;

- **Step 2, Identification of Discharge Conditions;** Derive the values of discharge heat and momentum of the stack plume for individual cases;

- **Step 3, Estimate of Pollutant Dispersion;** Estimate the maximum ground level concentration and distance from source from look-up charts;

- **Step 4, Combine Impacts of Groups of Sources.**

- **Step 5, Predicted Ambient Concentrations;** Obtaining the total ambient concentrations of the pollutants of concern incorporating all sources;

- **Step 6, Comparison with National Air Quality Objectives;** Such a comparison leads to the decision concerning further investigation of industrial processes as part of Stage 3 of review and assessment.

4.3 Limitations in the use of the Screening Method

4.3.1 The guidance applies primarily to industrial stacks releasing buoyant plumes of gaseous or gas-like pollutants where there are no significant slopes or buildings nearby to complicate the dispersion calculations. It is less applicable to other situations, examples of which are given below:

- The stack is within an area where the ground rises above the stack height within 10 stack heights;

- The stack is outside the range of 20-200m. If greater than 200m a conservative estimate can be obtained by assuming a 200m stack. If the stack is less than 20m the guidance is inapplicable;

- The stack is near a building which is more than 40% of the stack height within 5 stack heights;

- The particles in the plume have diameters of more than a few tens of micrometers;

- The bulk density of the efflux gases is significantly higher or lower than for air under the same conditions, or the release temperature is significantly below ambient temperature;

- The exit velocity is outside the range of 10-25m/s;

- The efflux heat and momentum, when plotted do not lie in the shaded area of the charts, whereby an additional factor of up to 2 uncertainty should be applied.

If such situations apply to the stack(s) being studied, the method may not be applicable or the results of such a study viewed with caution.

4.4 Input Information Used in the Assessment

4.4.1 The data inputs used were taken partly from the Environment Agency's and SEIPH's emissions databases. The latter is derived from the LRC's London Emissions Inventory. The detailed information used for each process included:

- Stack heights, efflux velocities, volume flow rates, stack gas temperature, number of flues and flue diameters;
- Exact locations for each process, and building dimensions i.e. those buildings associated with the industrial process;
- Pollutant emissions from each stack;
- Operational characteristics of the processes.

4.4.2 Other information required for the GN24 method includes a value for surface roughness and meteorological data. The former accounts for the turbulence of air movements caused by obstacles, such as buildings on the ground, whilst the latter reflects that different meteorological conditions prevail in different parts of the UK. For the purposes of this Stage 2 the meteorological data used were type 1, with a default and surface roughness of between 0.5 and 1.

4.4.3 The calculation of efflux heat and momentum was required so that the look-up charts could be used. It is also required that, where multi-flue stacks exist they should be combined for the purposes of the screening model, i.e. the volume flow rates and emissions combined through a flue of equivalent diameter. The dimensions and number of individual flues in the stack determine the equivalent diameter.

4.4.4 A summary of the input variables included in the screening is given in Table 4 (see Appendix 3). It should be noted that the present emissions were used for the purposes of the screening model. This again provides a conservative approach, since it assumes that there will be no reduction in industrial emissions between now and 2005 (although it should be noted that the Council's Stage 1 report confirms that the Lots Road power station will no longer be in operation by 2005).

4.5 Applying Results to the NAQS Objectives

4.5.1 The temporal statistics available as part of the screening process are:

- Annual Average;
- 99.9^{th} percentile of hourly concentrations over a year;
- 100^{th} percentile of hourly concentrations over a year.

These do not relate to all of the NAQS objectives for all pollutants however, as shown in the following table:

Table 2 Selection of Statistics for Comparison with the NAQS Objectives

Pollutant	NAQS Objectives	Is the NAQS Objective Available through the Screening model (y/n?)	Surrogate Statistic Advised for use
1,3 Butadiene	Annual Average	yes	-
Benzene	Annual Average	yes	-
CO	100th percentile of 8 hour averages in a year	no	100th percentile of hourly averages in a year
Lead	Annual Average	yes	-
NO_2	Annual Average	yes	-
	100th percentile of hourly averages in a year	yes	-
PM10	99th percentile of running 24 hour averages in a year	no	99.9th percentile of hourly averages over a year
SO_2	99.9th percentile of 15 minute averages over a year	no	99.9th percentile of hourly averages over a year

4.5.2 The surrogate statistics used in the screening method for SO_2 and PM10 need to be converted to more closely represent the requirement of the NAQS Objectives. This is achieved by the use of conversion factors for both the ground level concentration (GLC) as well as the distance from the stack to which it applies. A summary of the conversion factors is given below:

Table 3 Factors to Convert Screening Model to NAQS Objectives

NAQS Objective	Surrogate Statistic from Screening Method			
	99.9th percentile of hourly averages over a year		100th percentile of hourly averages in a year	
	GLC	Distance	GLC	Distance
99.9th percentile of 15 minute averages over a year SO_2	1.34	1	-	-
99th percentile of running 24 hour averages in a year PM10	0.6	2	-	-

4.6 Conservatisms and Uncertainties Associated with use of the Screening Model

4.6.1 The following provides list of conservative approaches, which will tend to over estimate the impact of the industrial processes:

- All NO_x emissions are NO_2 and all particles are PM10;
- Where stack heights are not explicitly available lower stack heights were often chosen to provide a conservative estimate;
- Emissions at the present level were used to predict for 2005;
- The distance of the impact of the individual sources is multiplied by 3;
- A factor of 2 will be applied to all of the 99.9th and 100th percentile predicted concentrations, including groups of processes.

4.6.2 The following provides a list of the uncertainties associated with the impact estimate of each process:

- Uncertainties in the discharge data;

- Met data:
  Statistical rather than hourly sequential data;
  Representativeness of the stack location;
  Inter-annual variability of meteorological conditions.

- Human error associated with the use of the screening method, between 20% and a factor of 2;

- The inherent uncertainties associated with all dispersion modelling which in general terms, for the new generation models, are likely to be a few 10's of percent for long term estimates (annual averages) and up to a factor of 2 for short term estimates.

4.7 Evaluation of Groups of Sources

4.7.1 The evaluation method allows the combination of up to 5 sources i.e. assuming that the maximum ground level concentration, from each, coincide. For individual industrial sources the area of impact is determined by multiplying the distance to the maximum ground level concentration by three. This area is then used to identify the groups.

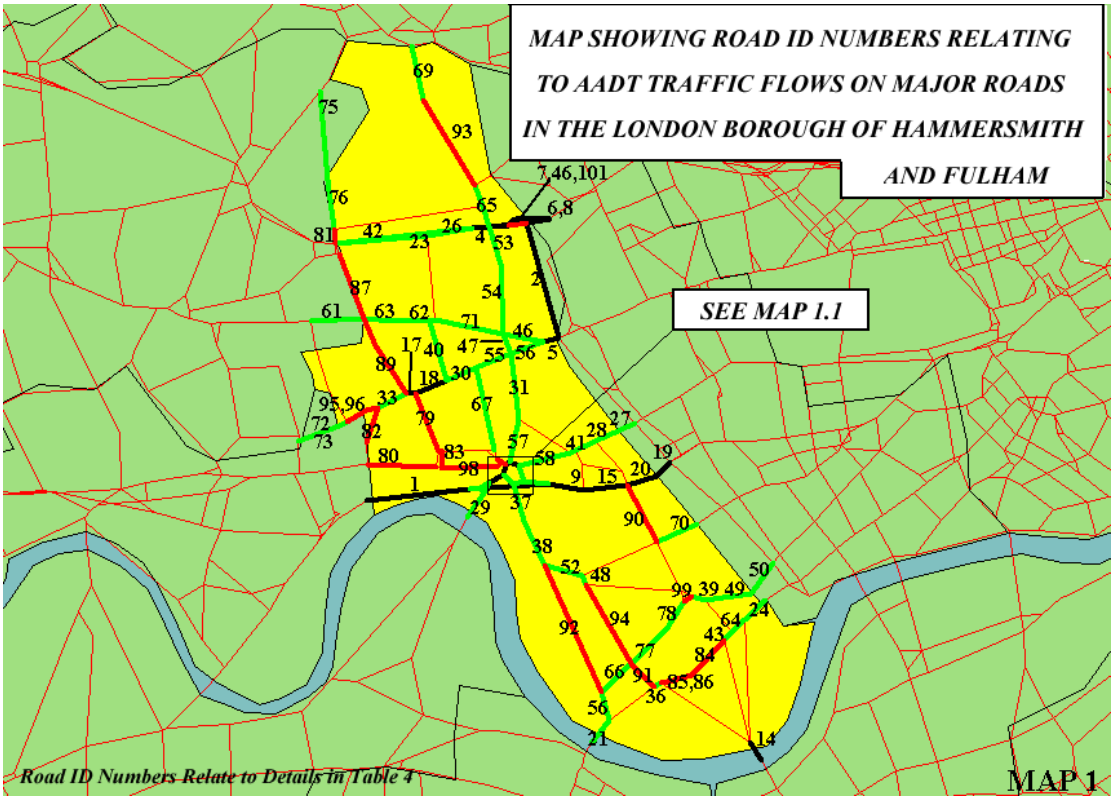
4.7.2 The operational mode of the industrial sources is "normal operation", not for example, emissions during start up or whilst using a stand-by fuel. This is considered to be suitable for the annual average statistics but not for the 99.9^{th} and 100^{th} percentiles. An increase by a factor of two will therefore be applied to each of the air pollution concentrations relating to the high percentile statistics, to compensate for the likely underestimate. This factor will also apply to groups of industrial processes, an unlikely event, which provides another conservative approach.

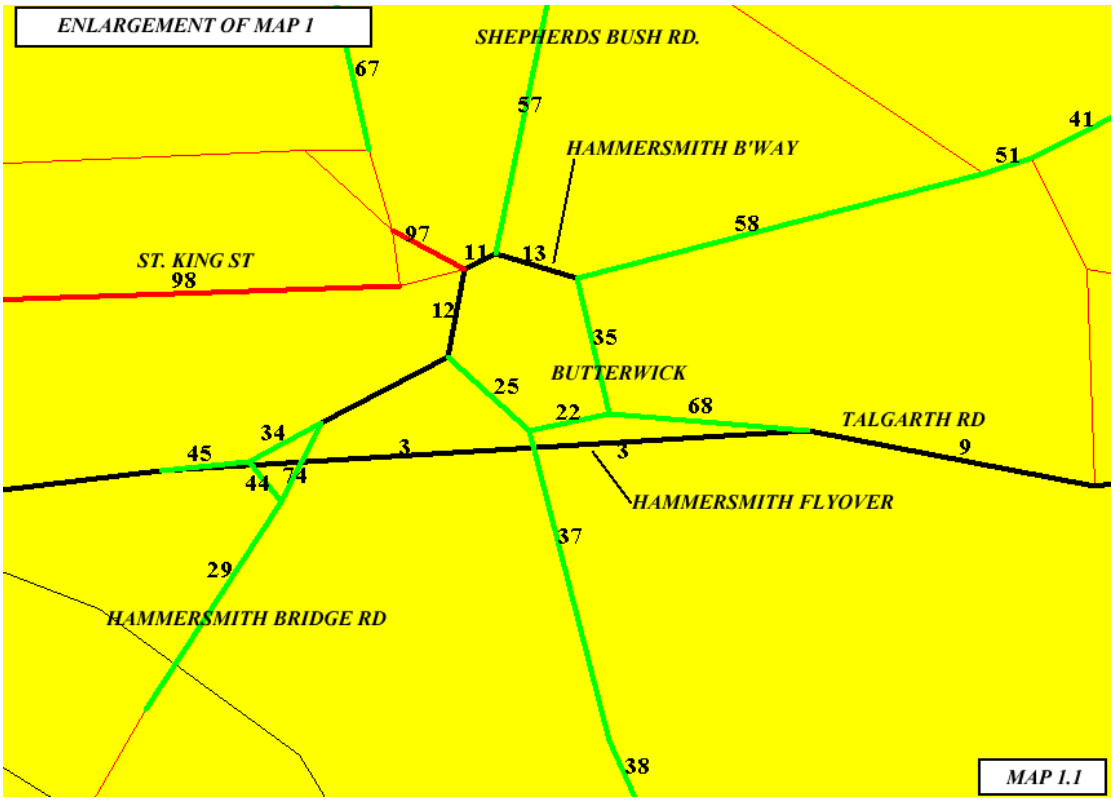
5.0 The following sections provide the pollution specific review and assessment for Stage 2 of those pollutants identified in the Stage 1 report:

- **NO_2, PM10 and SO_2**

References:

1. LB Hammersmith and Fulham (1999) Review and Assessment of Air Quality Stage One for the London Borough of Hammersmith and Fulham
2. DETR (1998); LAQM.TG4 (98) Pollutant Specific Guidance – advice on review and assessment.
3. Highways Agency (1998); Design Manual for Roads and Bridges (revised version)
4. Environment Agency (1998); Guidance for Estimating the Air Quality Impact of Stationary Sources (GN24)


MAP SHOWING ROAD ID NUMBERS RELATING
TO AADT TRAFFIC FLOWS ON MAJOR ROADS
IN THE LONDON BOROUGH OF HAMMERSMITH
AND FULHAM
SEE MAP 1.1
Road ID Numbers Relate to Details in Table 4
MAP 1


ENLARGEMENT OF MAP 1
SHEPHERDS BUSH RD.
HAMMERSMITH B'WAY
ST. KING ST
BUTTERWICK
TALGARTH RD
HAMMERSMITH FLYOVER
HAMMERSMITH BRIDGE RD
MAP 1.1

6.0 Second Stage Review and Assessment of Nitrogen Dioxide

The Government has adopted a 1-hour average of 150 ppb as an air quality standard for nitrogen dioxide (NO_2), with an objective for the standard to be achieved as the hourly maximum by the end of 2005. The Government has also adopted an annual average of 21 ppb as air quality standard with an objective to achieve this by the end of 2005. The focus of an authority's review and assessment for the annual average objective should be non-occupational, near ground level outdoor locations with elevated NO_2 concentrations in areas where a person might reasonably be expected to be exposed over a year (e.g. in the vicinity of housing, schools or hospitals etc.). The focus of the authority's review and assessment for the hourly objective should be any non-occupational, near ground level outdoor location given that exposures over one hour are potentially likely in these locations.

6.1 Introduction

6.1.1 The Council will need to conduct a third stage review and assessment of nitrogen dioxide, if the second stage indicates that there is a significant risk of the prescribed objectives (i.e. either the annual mean or the one hour maximum concentration) not being achieved in a relevant location, by the end of 2005.

6.1.2 To undertake the second stage the guidance suggests that the following issues need to be considered (from LAQM.TG4):

- Estimate annual mean concentrations of NO_x and NO_2 at the roadside locations identified for the year 2005.
- Predict maximum 1-hour concentrations of NO_2 at the roadside locations identified for the year 2005.

6.1.3 The guidance for nitrogen dioxide objective highlights road links with existing or projected annual average daily traffic flows greater than 20,000, large relevant industrial processes, or combinations of high traffic levels with other major sources as potentially significant sources.

6.2 Sources identified from the first stage review and assessment

6.2.1 The first stage review and assessment of nitrogen dioxide has indicated that the risk of the nitrogen dioxide air quality objectives being exceeded by the end of 2005 is significant.

6.2.2 Details of major roads were collated from the Stage 1 report and the LTS model. The traffic sources identified for those roads with more than 20,000 vehicles annual average daily traffic flow were as follows (see also Maps 1 and 1.1 on page 10 and Table 4 in Appendix 3):

- A40(T), M41, A4(T), Hammersmith Broadway, A217, A219, A306, A40, A4020, A402, A304, A308, A3218, A3219, A315, Munster Road, Paddenswick Road, North End Road, Askew Road, Conningham Road

6.2.3 No potentially significant Part A or Part B sources of nitrogen dioxide were identified in the Council's area. Potentially significant Part A sources were identified just outside the Council's area, including Lots Road power station, Guinness Brewing Worldwide Ltd and Powergen Plc.

6.2.4 Both current and projected 2005 annual mean NO_x concentrations for background locations have been derived from the pollution climate mapping technique (see SEIPH website at http//www.seiph.umds.ac.uk/envhlth for a full description of the methodology used).

6.3 Second stage review and assessment

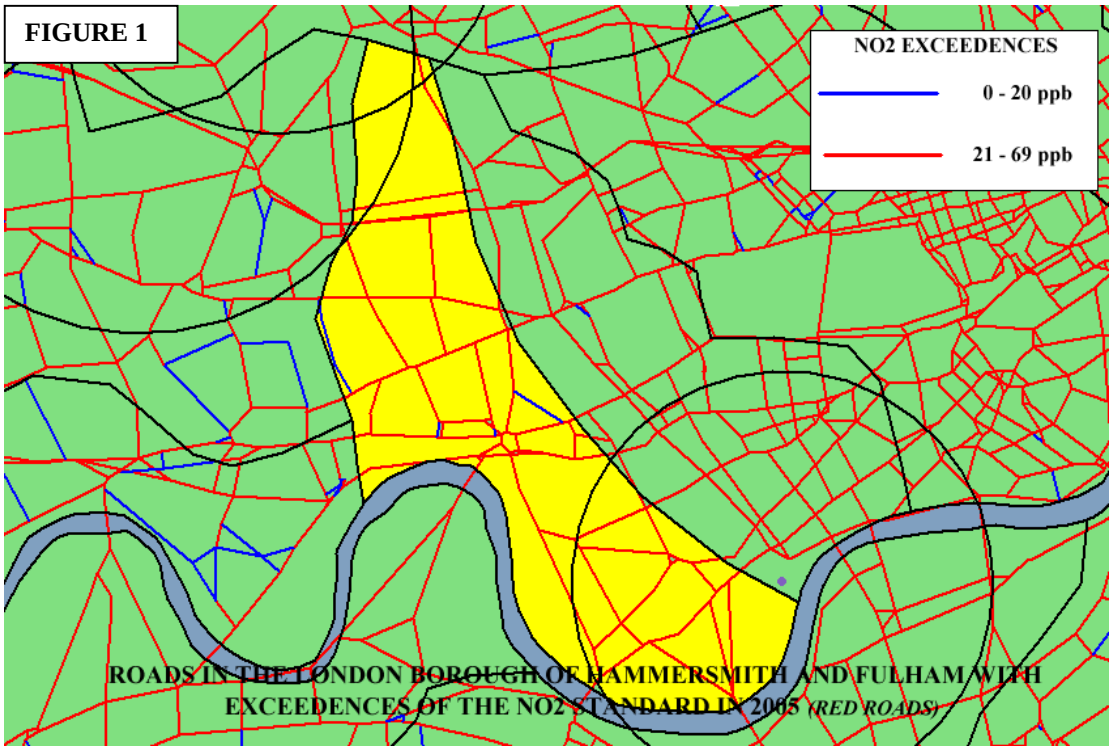
6.3.1 Roadside Locations (annual average concentrations)

6.3.2 Estimations of the annual mean NO_x concentration for the end of 2005 were prepared using the DMRB methodology. DMRB requires annual average vehicle flow, annual average speed, fraction of heavy-duty vehicles and the distance from the road to receptor in order to calculate these concentrations. Subsequent conversion to NO_2 is undertaken using empirical methods.

6.3.3 Table 5 in Appendix 4 gives the results of the revised DMRB assessment for all major road links within the Council's area, with estimated concentrations between 10 and 30m from the road centre line. (See Table 8 in Appendix4)

6.3.4 The results of the DMRB assessment show that nearly all road links within the Council's area are predicted to exceed the 2005 NAQS annual mean objective for NO_2, (i.e. 21 ppb) as a result of both high vehicle flows and the high ambient concentration arising in central London. The roads are also shown in Figure 1 below

FIGURE 1



6.3.5 Industrial sources

6.3.6 The results from the testing of the Part A industrial sources in the nearby Boroughs, using the GN24 methodology, gives predictions of less than 0.5 ppb as an annual mean. This methodology provides conservative estimates and therefore the impact from these sources can be considered as minimal, relative to the annual mean objective. The area of predicted impact is also shown in Figure 1 (see Table 7 in Appendix 4 for the results).

6.4 Conclusion

This second stage review and assessment has followed the Government's guidance for nitrogen dioxide through the use of the recommended screening models and methodology. Each method used applies a number of conservatisms, thus ensuring a precautionary approach to the review and assessment process.

The guidance also indicates that the existing national policies will not, in isolation, ensure that the national air quality objectives will be achieved by the end of the year 2005 for all areas. It further advises that those local authorities with major or heavily congested roads and the potential to result in elevated levels will need to progress to the third stage review and assessment.

The second stage review and assessment has indicated that the risk of the nitrogen dioxide air quality objectives being exceeded in the Council's area by the end of 2005 is significant.

Therefore, the London Borough of Hammersmith and Fulham is advised to undertake a third stage review and assessment of nitrogen dioxide.

7.0 Second Stage Review and Assessment of PM10

The Government has adopted a running 24-hour average of 50 μg/m^3 as an air quality standard for PM10, with the objective for the standard to be achieved as the annual 99th percentile of daily maximum running 24-hour averages (that is no more than 4 days exceeding the standard in any one year), by the end of 2005. The focus of an authority's review and assessment for PM10 should be non-occupational, near ground level outdoor locations with elevated PM10 concentrations in areas where a person might reasonably be expected to be exposed over a 24 hour period (e.g. in the vicinity of housing, schools or hospitals etc.). This standard has been based on the recommended standard proposed by the Expert Panel on Air Quality Standards (EPAQS).

7.1 Introduction

7.1.1 The Council will need to conduct a third stage review and assessment of PM10 if the second stage review and assessment indicates that there is a significant risk of the prescribed objective not being achieved by the end of 2005. The Government has further advised that most local authorities will need to progress to a third stage review for this pollutant.

7.1.2 The Government considers that the PM10 objective will be the most difficult to achieve for most authorities, since many of the sources are outside the control of individual local authorities.

7.1.3 The DETR guidance (LAQM.TG4 (98)) is non-specific for undertaking the Stage 2 Review and Assessment. To undertake the second stage the following parameters need to be considered, based on the revised DMRB and GN24 methodologies;

- roadside concentrations of PM10 for the road links identified
- the "impact footprint" of PM10 concentrations around significant industrial emission sources

7.2 Sources identified from the first stage review and assessment

7.2.1 The first stage review and assessment has indicated that the risk of the PM10 air quality objective being exceeded by the end of 2005 is significant across the whole of the Council's area.

7.2.1 The roads with daily vehicle flow greater than 25,000 are as follows, with the details of the major roads collated from the Stage 1 report and the LTS model. (See also Maps 1 and 1.1 on page 10 and Table 4 in Appendix 3):

- **A40(T), M41, A4(T), Hammersmith Broadway, A217, A219, A306, A40, A4020, A402, A304, A308, A3218, A3219, A315, Paddenswick Road, Conningham Road**

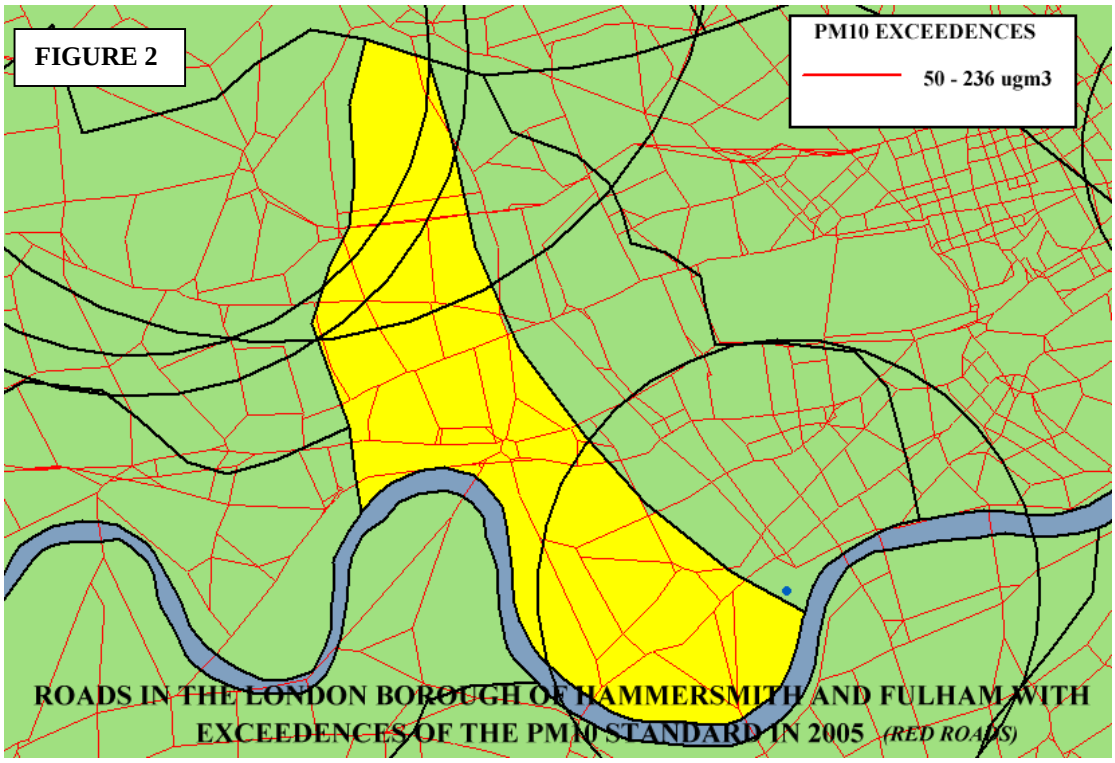
7.2.3 No potentially significant Part A or Part B sources of nitrogen dioxide were identified in the Council's area. Potentially significant Part A sources were identified just outside the Council's area, including Lots Road power station, Guinness Brewing Worldwide Ltd and Powergen plc.

7.3 Second stage review and assessment

7.3.1 Roadside locations

7.3.2 Estimations of the 99th percentile of 24 hour rolling mean PM10 concentrations were made for the end of 2005 using the DMRB methodology. Following screening of major road links in the Council's area, it was found that all the roads tested are

predicted to exceed the 2005 NAQS objective for PM10 (these are shown in Figure 2 below). The details for these are given in Table 6 in Appendix 4.



7.3.3 Industrial sources

7.3.4 The large Part A sources identified were tested using the GN24 methodology. The results of this testing indicate that no Part A source will cause an exceedence of the PM10 objective on its own (see Table 7 in Appendix 4). The area of predicted impact using the method is shown above in Figure 2.

7.4 Conclusion

The guidance for the second stage review and assessment of PM10 is non-specific, however the same methodology has been applied as for the other pollutant screening in this report. The results confirm the view of the Government, referred to above in 7.1.1, that the national air quality objectives will not be achieved by the end of the year 2005 and that local authorities will need to progress to the third stage review and assessment.

The second stage review and assessment has indicated that the risk of the PM10 air quality objectives being exceeded in the Council's area by the end of 2005 is significant.

Therefore, the London Borough of Hammersmith and Fulham is advised to undertake a third stage review and assessment of PM10.

8.0 Second Stage Review and Assessment of Sulphur dioxide

The Government has adopted a 15-minute average of 100ppb as an air quality standard for sulphur dioxide (SO_2) with the objective for the standard to be achieved as the 99.9th percentile (that is, on all but 35 periods of 15 minutes per year), by the end of 2005. The focus of an authority's review and assessment for SO_2 should be on any non-occupational, near ground level outdoor locations given that exposures over 15 minutes are potentially likely in these locations. This has been based on the recommended standard proposed by the Expert Panel on Air Quality Standards [(1)]. There were a large number of exceedences of the recommended EPAQS standard in London during 1995[(3)].

8.1 Introduction

8.1.1 The Council will need to conduct a third stage review and assessment of sulphur dioxide if the second stage review and assessment indicates that there is a significant risk of the air quality objective not being achieved by the end of 2005 in relevant locations.

8.1.2 To undertake the second stage the following parameters need to be considered:

- the annual mean and 99.9th percentiles of 15 minute average concentrations of SO_2.

8.1.3 The guidance for the sulphur dioxide objective highlights specific large industrial processes as potentially significant sources.

8.2 Sources identified from the first stage review and assessment

8.2.1 The first stage review and assessment for sulphur dioxide has indicated that the risk of the air quality objective being exceeded by the end of 2005 is not negligible.

8.2.2 Details of large industrial processes were collated from the Environment Agency and SEIPH's emissions databases and the following industrial sources were identified as being potentially significant:

Part A industrial sources include Lots Road Power Stations in the Royal Borough of Kensington and Chelsea, plus Guinness Brewing Worldwide Ltd and Powergen plc in the London Borough of Brent.

8.3 Second stage review and assessment

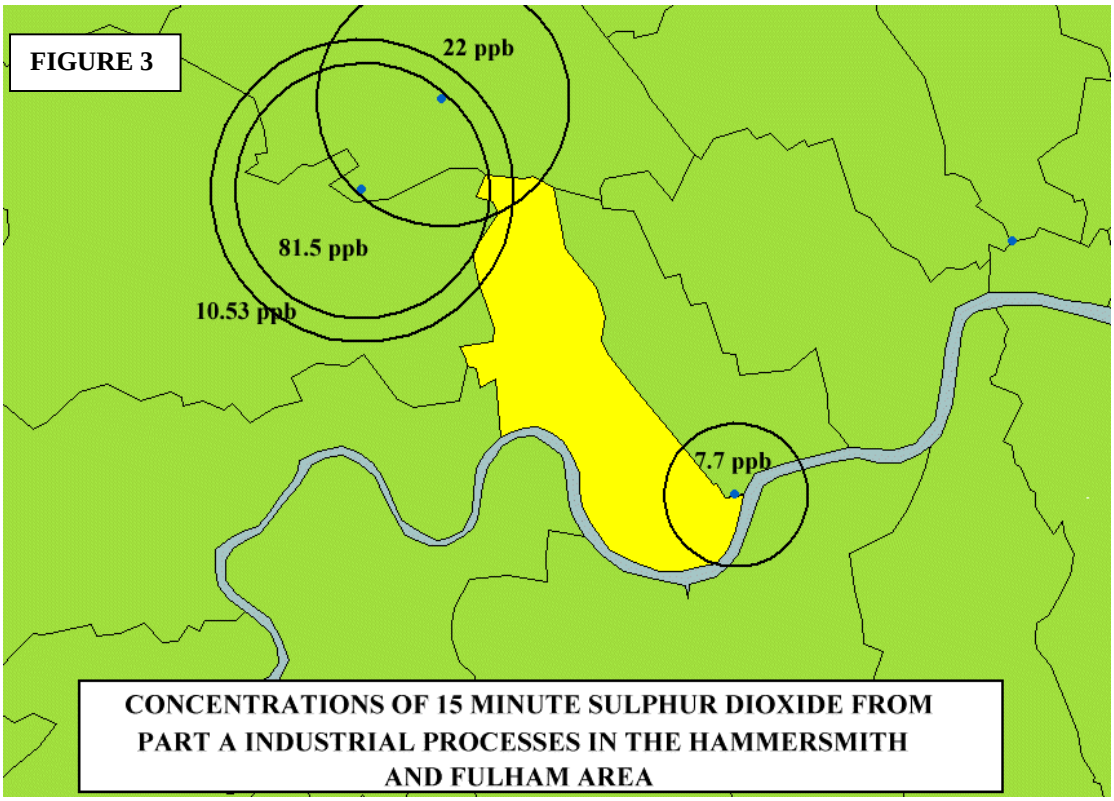
8.3.1 *Industrial Processes*

8.3.2 The prediction of annual mean and 99.9th percentile of 15-minute average concentrations for SO_2 were derived using the Environment Agency GN 24 method. This provided an estimate of the size of the "impact footprint" for each stack. The NAQS objective was derived using the LAQM.TG4 (98) methodology.

8.3.3 Road transport is a relatively small source of sulphur dioxide and therefore need not be considered separately. The guidance however suggests that 2 ppb per 10,000 vehicles annual average daily traffic flow be added to the overall estimate of the 99.9th percentile of 15 minute averages, where appropriate, given the need to focus on those areas where individuals are likely to be exposed.

8.3.4 The result of the screening using the GN 24 methodology indicates that the maximum concentration from the nearby Part A processes is minimal and well below the

objective level of 100ppb even if the background due to road sources is added where it impacts the Council's area. The exception to this is one of the sources in the LB of Brent to the north of the Council's area. For this source the predicted concentration is much closer to the objective at 81.5 ppb. It is however still below the objective and only just impacts on the Council's area. The results are given in Table 7 and also presented below as Figure 3.



8.4 Conclusion

This second stage review and assessment has followed the Government's guidance for sulphur dioxide through the use of the recommended screening models and methodologies. The guidance highlighted that exceedences currently occur in the vicinity of industrial processes and this report has focused on the largest nearby sources. The guidance also includes a number of conservatisms and therefore adopts a precautionary approach.

The second stage review and assessment has indicated that the risk of the sulphur dioxide air quality objective being exceeded by the end of 2005 is negligible.

The London Borough of Hammersmith and Fulham therefore need not undertake a third stage review and assessment of sulphur dioxide.

9.0 Conclusion and Recommendation

The methodology used to screen the major sources identified in the Stage 1 report is as recommended by the DETR guidance for both nitrogen dioxide and sulphur dioxide. For PM10 the DETR have not recommended screening methods, therefore the same methodologies have been used as for the other two pollutants. Both the revised DMRB and GN 24 methodology permit predictions of PM10.

The results of the testing in this Stage 2 Review and Assessment have highlighted that, for the following pollutant, no further action need be taken:

Sulphur dioxide

However the results suggest that further investigation is needed for the remaining pollutants tested, as follows:

Nitrogen dioxide
PM10

The Council is therefore recommended to undertake a detailed Stage 3 of the Local Air Quality Management Review and Assessment process for these pollutants.

Appendices

1. List of UK National Air Quality Strategy standards/objectives

2. Summary of Stage 2 Review and Assessment derived from LAQM TG4 (98)

3. Details of Traffic Flows collated for Stage 1

4. DMRB Calculations of Roadside pollutants relevant to Stage 2 Review and Assessment for the London Borough of Hammersmith and Fulham.

APPENDIX 1

Air quality objectives from the Air Quality Regulations 1997 (SI No. 97/3043)

Pollutant	***Standard***	***Objective for 2005***
Benzene	*5ppb running annual mean*	*5ppb running annual mean*
1,3-butadiene	*1ppb running annual mean*	*1ppb running annual mean*
Carbon monoxide	*10ppm running 8 hour mean*	*10ppm running 8 hour mean*
Lead	*0.5µg/m^3 annual mean*	*0.5µg/m^3 annual mean*
Nitrogen dioxide	*150ppb - one hour mean* *21ppb - annual mean*	*150ppb - one hour mean* *21ppb - annual mean*
PM10	*50µg/m^3 running 24 hour mean*	*50µg/m^3 running 24 hour mean (measured as 99th percentile)*
Sulphur dioxide	*100ppb - 15 minute mean*	*100ppb - 15 minute mean (measured as 99.9th percentile)*
Ozone	*50ppb running 8 hour mean*	*50ppb running 8 hour mean (measured as 97th percentile)*

APPENDIX 2

Summary of Stage 2 Review and Assessment

These are derived from the DETR Pollutant - Specific Guidance (paragraph 1.11 of LAQM TG4 (98)) -

General

"The aim of the second stage review and assessment is to provide a further screening of pollutant concentrations in the local authority areas. It is not intended that it should provide an accurate prediction of levels of current or future air quality across the whole of the authority's area. The second stage does not require a local authority to estimate every area of exceedence within its locality for each pollutant in question or to estimate the geographical extent of potential exceedences."

The screening for Stage 2 involves the selection of a number of locations, where the highest likely concentrations are likely. These need review and assessment as to whether there is a significant risk of the NAQS objective not being achieved. If Stage 2 indicates that the levels will not be achieved the Council will need to undertake a detailed and accurate third stage air quality review and assessment.

The Stage 2 will also have regard to locations where individuals are likely to be exposed over the averaging time of the prescribed objective, as follows:

- For short averaging times (SO_2 and hourly NO_2) the focus is on any non-occupational, near ground level outdoor location given that exposures over such short averaging times are potentially likely
- For longer averaging times the focus should be near ground level outdoor non-occupational locations, including background locations, roadside locations and other areas of elevated pollutants concentrations where a person might reasonably be expected to be exposed over the relevant averaging time of the objective

For each of the following pollutants the following investigations will be undertaken:

Benzene

Only areas affected by industrial ground level or point sources alone or in combination with road sources are likely to be at risk of exceedence.

TG4 guidance advises that simple modelling may not be relevant – therefore it suggests the use of passive diffusion tube sampling for existing sources to determine annual mean > 5ppb.

1,3-Butadiene

This is similar to benzene as no simple monitoring techniques are available for Stage 2 and simple modelling is considered not likely to be relevant.

TG4 therefore advises that for any area with a likely exceedence of the objective, as identified in Stage 1, a third stage R&A should be undertaken.

Lead

TG4 advises that current and future annual mean concentrations should be estimated by adding the industrial contribution (summing any overlapping plumes) with current and projected annual mean urban background concentration.

Alternatively monitoring can be undertaken (although measurements should have < 30% uncertainty).

Industrial locations - to identify current and 2005 annual mean concentrations for Part A/B processes use EA method, this gives an impact footprint. Where sources overlap then concentrations should be summed.

Urban background locations - concentrations from road transport can be derived from suitable monitoring sites or DETR WWW site. For 2005 concentration can be assumed to be 0.03$\mu g/m^3$.

Carbon monoxide

Screening modelling can be applied for areas where the risk of exceedence is not negligible it is necessary to consider mainly roadside locations and some industrial locations and also where applicable a combination of such locations should be considered. In all cases an urban background concentration should be applied.

Alternatively monitoring can be undertaken (although measurements should have < 30% uncertainty). Where road transport is the dominant source during episodes then the ratio of current to 2005 fleet emission factors, times a factor based on road traffic growth forecast, can be used to predict max 8 hour concentration.

Roadside locations – for the current year and 2005 near busy existing and planned roads where public likely to be exposed, use DMRB (note - NRTF can be used, where local traffic data are unavailable). Both annual mean and max 8-hour concentrations can be predicted and a background should also be added.

Industrial locations – typical concentrations likely to be low 10-100ppm in stack gas. Use EA method for max 8 hour concentration and add background concentration (either annual average or more conservatively the 90th percentile of 8 hour values, which can be assumed to be twice annual mean).

Urban background locations - concentrations can be derived from suitable monitoring sites or DETR WWW site. For 2005 annual average concentration can be assumed to be half 1996 value. (Note – annual average correlates poorly with max 8-hour mean).

Overlapping road and industrial sources – the overall maximum 8 hour maximum concentration can be estimated from the sum of:

i) The maximum 8 hour concentration from industrial sources and the 90th percentile of 8 hour averages at urban background and major road sources. OR

ii) The annual mean concentration from industrial sources and the maximum 8 hour concentration due to urban background/ major road sources.

(Note -the precautionary approach requires that the larger be selected.)

Nitrogen dioxide

The screening models use concentrations of the primary pollutant (NO_x), with subsequent conversion to NO_2 using empirical methods. The prediction of annual mean NO_2 should be based on the DMRB methodology for roads, and either EA method. Appropriate continuous monitoring data can be used to assess background concentrations.

As an alternative to screening monitoring can be used (although measurements should have < 30% uncertainty). Where road transport is the dominant source during episodes then the ratio of current to 2005 fleet emission factors of NO_x, times a factor based on road traffic growth forecast can be used to predict max hour concentration

For annual mean NO_2 concentrations:

Roadside locations use DMRB to calculate NO_x and add background NO_x then compare to NO_2 using TG4

Industrial locations use EA method to derive NO_2 with overlapping sources added. Assumed average ratio of NO_2 /NO_x at point of maximum impact is 0.2. (Where higher concentrations of NO_2 emitted then add NO_2 + 0.2NO)

Urban background concentrations can be obtained from monitoring data, for 2005 assume NO_x is 0.5 of 1996 value or 0.6 of 1998 value and NO_2 is 0.7 of 1996 value or 0.75 of 1998 value. (Note this assumes no change in ozone concentrations over this time period)

Combined sources add roadside, industrial and background NO_x and compare to NO_2 (although it should be noted that the industrial NO2 will be overestimated).

For max 1 hour concentrations:

Roadside locations use DMRB then multiply annual mean NO_2 by 6

Industrial locations use the smaller of
max 1 hour NO_x max, plus background (assumed as twice annual mean NO_2) OR
max oxidant (ozone + NO_2) measured nearest national AMN site.
(For multiple sources only sum if close together e.g. on same site)

Urban background multiply annual mean NO_x by 16 (although care is needed see TG4)

Combined sources add roadside 1 hour max NO_x, annual mean background NO_x determined by DMRB (x10) and largest annual mean industrial NO_x from stack of concern. Then compare resultant concentration to $N0_2$ using TG4.

PM10

TG4 advises that most local authorities will need to progress to a second and third stage review for this pollutant, with the exception of some local authorities in the north and west of the U.K. If low level combustion sources other than road transport are significant, then LAs can undertake a second stage R&A, but should also undertake a third stage. The second stage is also inadequate for estimation of large fugitive or uncontrolled dusts.

Sulphur dioxide

The 99.9^{th} percentile of 15-min average concentrations should be estimated for the current year and 2005. As an alternative it is possible to use the number of exceedences. Where sources do *not* overlap use the sum of the industrial source

estimate, twice the annual average background and roadside concentration, if appropriate. Where sources do overlap the number of exceedences should be estimated for each source by summing the number of exceedences.

Alternatively monitoring data can be used if appropriate to exposure of public (use EA method), although > 3 years data are needed. Bubblers can be used for annual daily max, and to obtain annual 99.9th percentile of 15-min averages (use Willis formula see TG4).

Roadside locations – represents a small source, it is estimated that 2 ppb per 10,000 vehicles AADT should be added to the 99.9th percentile of 15 min averages.

Urban background locations - concentrations can be derived from suitable monitoring sites or DETR WWW site.

Industrial locations – Part A processes- apply EA method for annual mean and 99.9th percentile of 15-min average concentrations around each stack. Impact footprint should also estimated, and where footprints overlap, it should be assumed that plumes do not impact simultaneously. EA method does not provide estimate of number of exceedences, although does give estimate of 99.9th percentile and max hourly average. Interpolation should be used from exceedences of 1 hour 75ppb, although the risk of exceedence where number of hours is < 9 is negligible (see TG4). Mean urban background should be included (the precautionary approach is to use x2 value). Overlapping footprints should be added.

Part B/ solid fuel/oil combustion processes > 5MW use EA method to obtain 99.9th percentile. (Note overlapping sources are not likely to be problem).

Note – an “impact footprint” can be drawn from a circle centred on a stack, with a radius of twice the distance to point of maximum impact.

APPENDIX 3

APPENDIX 4

N.B. The DMRB and GN 24 methods are screening tools and therefore the results given are a conservative prediction in line with the precautionary approach.

A fuller explanation is given in the DMRB / GN 24 methodology section in the main body of the report.

List of tables

List of figures