



Thurrock Flexible Generation Plant

**Environmental Statement Volume 6
Appendix 12.5: Results of Other Scenarios Modelled**

Date: February 2020

Environmental Impact Assessment

Environmental Statement

Volume 6

Appendix 12.5

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Table of Contents

1. Introduction.....	1
1.2 Scenario 2: 48 x 12.4 MW engines, 4 engines per stack (12 Stacks)	1
1.3 Scenario 3: 33 x 18.4 MW engines, each engine has its own stack (33 stacks)	4
1.4 Scenario 4: 33 x 18.4 MW engines, aggregated stacks of 6 groups of five engines per stack and one group of three engines per stack (7 stacks).....	8
2. Cumulative Effects Assessment	13
2.1 Scenario 2: 48 x 12.4 MW engines, 4 engines per stack (12 Stacks)	13
2.2 Scenario 3: 33 x 18.4 MW engines, each engine has its own stack (33 stacks)	20
2.3 Scenario 4: 33 x 18.4 MW engines, aggregated stacks of 6 groups of five engines per stack and one group of three engines per stack (7 stacks).....	27
3. References	35

List of Tables

Table 1.1: Stack Locations for Scenario 2.....	1
Table 1.2: Long-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 2.....	1
Table 1.3: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	2
Table 1.4: Short-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 2.....	3
Table 1.5: Stack Locations for Scenario 3.....	4
Table 1.6: Long-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 3.....	5
Table 1.7: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	6
Table 1.8: Short-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 3.....	7
Table 1.9: Stack Locations for Scenario 4.....	8
Table 1.10: Long-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 4.....	9
Table 1.11: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	10
Table 1.12: Short-term Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 4.....	11
Table 2.1: Long-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors –Scenario 2.....	14
Table 2.2: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	16
Table 2.3: Short-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 2.....	18
Table 2.4: Long-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors –Scenario 3.....	21
Table 2.5: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	23

Table 2.6: Short-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 3.....	25
Table 2.7: Long-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors –Scenario 4.....	28
Table 2.8: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	30
Table 2.9: Short-term Cumulative Predicted NO ₂ Concentrations (µg.m ⁻³) at Sensitive Receptors – Scenario 4.....	32

List of Figures

Figure 1.1: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	3
Figure 1.2: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	7
Figure 1.3: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	10
Figure 2.1: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	16
Figure 2.2: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	23
Figure 2.3: Annual-mean NO ₂ Concentrations at GR13 (µg.m ⁻³).	30

Summary

This appendix outlines the results of three scenarios that were modelled but not included in Volume 3, Chapter 12: Air Quality.

Qualifications

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1. Introduction

1.1.1 Four different engine scenarios have been modelled:

1. 48 x 12.4 MW engines, each engine has its own stack (48 stacks)
2. 48 x 12.4 MW engines, aggregated stacks of four engines per stack (12 stacks)
3. 33 x 18.4 MW engines, each engine has its own stack (33 stacks)
4. 33 x 18.4 MW engines, aggregated stacks of 6 groups of five engines per stack and one group of three engines per stack (7 stacks).

1.1.2 The predicted concentrations were highest for Scenario 1 which are presented in the main chapter. The results for Scenarios 2, 3 and 4 are presented in this appendix.

1.2 Scenario 2: 48 x 12.4 MW engines, 4 engines per stack (12 Stacks)

Stack Locations

1.2.1 Table 1.1 outlines the modelled stack locations for Scenario 2.

Table 1.1: Stack Locations for Scenario 2.

Engine Number	X (m)	Y (m)
1	566362	176591
2	566365	176605
3	566369	176617
4	566374	176632
5	566377	176645
6	566388	176684
7	566392	176698
8	566396	176711
9	566399	176725
10	566404	176738
11	566413	176774

Engine Number	X (m)	Y (m)
12	566417	176788

Long-term Impacts

1.2.2 Table 1.2 summarise the long-term maximum Process Contribution (PC) and Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 1.2: Long-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 2.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	2.2	5	28.6	72	Negligible
2	Sandhurst Road	26.4	1.6	4	28.1	70	Negligible
3	School	34.0	0.8	2	34.9	87	Slight
4	Gateway Academy	28.7	0.3	1	29.0	72	Negligible
5	Gravel Pit Cottages	18.0	2.6	7	20.6	52	Slight
6	Princess Margaret Rd	18.0	1.4	4	19.5	49	Negligible
7	Walnut Tree Farm	18.3	2.6	7	21.0	52	Slight
8	The Green	18.3	0.8	2	19.1	48	Negligible
9	West Street	41.8	0.4	1	42.3	106	Moderate
10	Milton School	30.9	0.3	1	31.2	78	Negligible
11	Royal Pier Road	31.8	0.4	1	32.2	81	Negligible
12	West Tilbury Hall	18.3	1.0	2	19.3	48	Negligible
13	Cooper Shore	18.3	1.5	4	19.8	50	Negligible
14	R1	31.1	0.1	0	31.2	78	Negligible
15	R2	27.6	0.1	0	27.7	69	Negligible
16	R3	28.3	0.2	0	28.5	71	Negligible
17	R4	26.9	0.2	0	27.1	68	Negligible
18	R5	32.2	0.2	1	32.4	81	Negligible
19	R6	26.9	0.3	1	27.2	68	Negligible

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
20	R7	28.1	0.2	1	28.3	71	Negligible
21	R8	28.9	0.3	1	29.2	73	Negligible
22	R9	36.6	0.7	2	37.3	93	Slight
23	R10	30.6	0.8	2	31.4	78	Slight
24	R11	26.6	0.7	2	27.3	68	Negligible
25	R12	26.1	0.7	2	26.8	67	Negligible
26	R13	26.4	1.5	4	27.9	70	Negligible
27	R14	26.8	1.2	3	28.0	70	Negligible
28	R15	23.6	2.2	5	25.8	64	Negligible
29	R16	25.8	0.9	2	26.7	67	Negligible
30	R17	26.2	0.8	2	27.0	68	Negligible
31	R18	24.1	0.2	0	24.3	61	Negligible
32	R19	31.6	0.8	2	32.4	81	Slight
33	R20	23.5	0.1	0	23.6	59	Negligible
34	R21	34.8	0.1	0	34.9	87	Negligible
35	R22	24.8	0.1	0	24.9	62	Negligible
36	R23	34.1	0.1	0	34.2	85	Negligible
37	R24	28.5	0.1	0	28.6	72	Negligible
38	R25	33.8	0.3	1	34.1	85	Negligible
39	R26	22.6	0.1	0	22.7	57	Negligible
40	R27	24.5	0.2	1	24.7	62	Negligible
41	16/01232/OUT	18.0	2.2	5	20.2	50	Negligible
42	18/00664/CONDC	29.9	1.5	4	31.4	79	Slight
43	16/00412/OUT	18.3	0.4	1	18.7	47	Negligible
44	15/00379/OUT	18.3	0.3	1	18.7	47	Negligible
45	16/01475/SCR	29.9	0.9	2	30.9	77	Slight
46	GR/17/674	22.4	0.2	0	22.6	57	Negligible

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
47	20141214	38.6	0.2	0	38.8	97	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

Receptors in bold exceed the AQAL

AC = Ambient concentration

AQAL = Air Quality Assessment Level

1.2.3 When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse'. The impact is 'moderate adverse' at one receptor only: West Street (receptor 9).

1.2.4 Predicted annual-mean NO₂ at the facades of existing receptors are below the Air Quality Strategy (AQS) objective for NO₂ for all receptors except West Street (receptor 9). At West Street, the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. The PEC with the development is 106% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 1.3: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

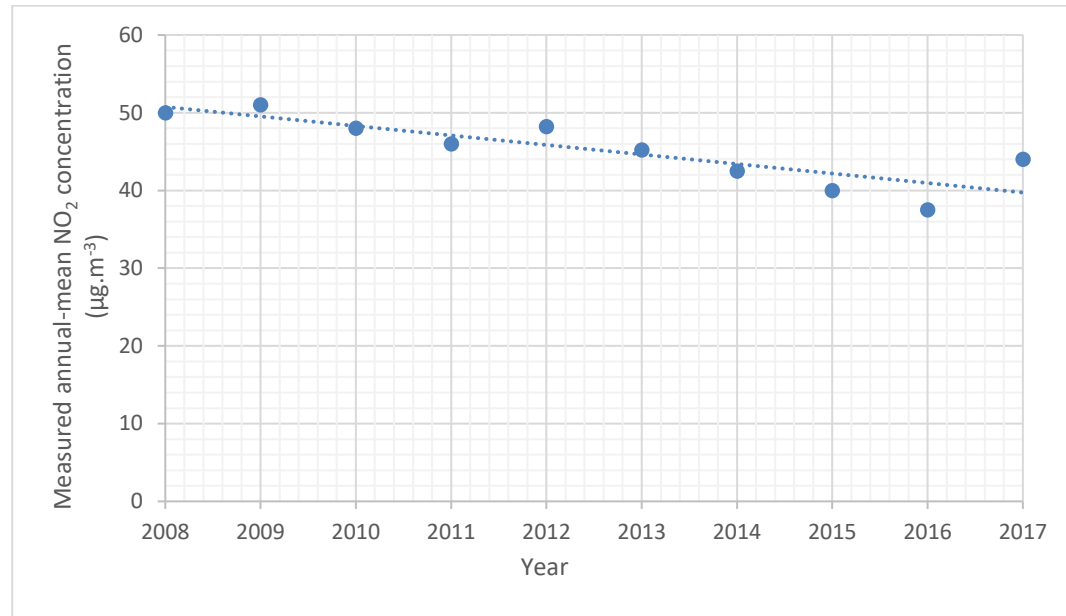


Figure 1.1: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

Table 1.4: Short-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 2.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	33.0	16	85.9	43	Slight
2	Sandhurst Road	52.9	28.7	14	81.6	41	Slight
3	School	68.1	17.3	9	85.3	43	Negligible
4	Gateway Academy	57.4	15.0	7	72.4	36	Negligible
5	Gravel Pit Cottages	36.0	26.8	13	62.8	31	Slight
6	Princess Margaret Rd	36.0	18.3	9	54.3	27	Negligible
7	Walnut Tree Farm	36.7	42.3	21	79.0	39	Moderate
8	The Green	36.7	27.4	14	64.0	32	Slight
9	West Street	83.7	16.3	8	100.0	50	Negligible
10	Milton School	61.7	15.0	8	76.8	38	Negligible
11	Royal Pier Road	63.6	15.7	8	79.3	40	Negligible
12	West Tilbury Hall	36.7	32.9	16	69.6	35	Slight
13	Cooper Shore	36.7	44.2	22	80.9	40	Moderate
14	R1	62.2	5.3	3	67.5	34	Negligible
15	R2	55.2	5.1	3	60.3	30	Negligible
16	R3	56.6	9.6	5	66.2	33	Negligible
17	R4	53.8	9.4	5	63.2	32	Negligible
18	R5	64.4	9.5	5	73.9	37	Negligible
19	R6	53.8	11.1	6	64.9	32	Negligible
20	R7	56.2	10.5	5	66.7	33	Negligible
21	R8	57.8	12.0	6	69.8	35	Negligible
22	R9	73.2	16.1	8	89.3	45	Negligible
23	R10	61.2	17.7	9	78.9	39	Negligible
24	R11	53.2	18.9	9	72.1	36	Negligible
25	R12	52.2	18.6	9	70.8	35	Negligible
26	R13	52.8	27.1	14	79.9	40	Slight
27	R14	53.6	24.6	12	78.2	39	Slight
28	R15	47.2	32.8	16	80.0	40	Slight

1.2.5 The results show at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is a conservative assumption and, in reality, the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and so concentrations are expected to decrease even further.

1.2.6 If the AC at West Street is assumed to be 37.5 µg.m⁻³ (the measured concentration in 2016), the PEC is only 96% of the AQAL and based on the Environment Agency's on-line guidance, further action would not be required. Further analysis of air quality in Gravesend is provided in Volume 6 Appendix 12.8 Further Analysis of Air Quality in Gravesend.

On that basis and using professional judgement, the overall significance of effect is considered to be minor adverse, which is not significant in EIA terms. Short-term Impacts

1.2.7 Table 1.4 summarises the short-term maximum PC and PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
29	R16	51.6	20.2	10	71.8	36	Negligible
30	R17	52.4	20.3	10	72.7	36	Negligible
31	R18	48.2	9.6	5	57.8	29	Negligible
32	R19	63.2	17.5	9	80.7	40	Negligible
33	R20	47.0	7.7	4	54.7	27	Negligible
34	R21	69.6	6.8	3	76.4	38	Negligible
35	R22	49.6	5.3	3	54.9	27	Negligible
36	R23	68.2	5.1	3	73.3	37	Negligible
37	R24	57.0	7.5	4	64.5	32	Negligible
38	R25	67.6	8.5	4	76.1	38	Negligible
39	R26	45.2	7.7	4	52.9	26	Negligible
40	R27	49.0	10.4	5	59.4	30	Negligible
41	16/01232/OUT	36.0	24.0	12	60.0	30	Slight
42	18/00664/CONDC	59.8	18.6	9	78.4	39	Negligible
43	16/00412/OUT	36.7	17.1	9	53.7	27	Negligible
44	15/00379/OUT	36.7	15.5	8	52.2	26	Negligible
45	16/01475/SCR	59.8	16.1	8	75.9	38	Negligible
46	GR/17/674	44.8	9.3	5	54.1	27	Negligible
47	20141214	77.3	8.8	4	86.1	43	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2. The AQAL is 200 µg.m⁻³.

1.2.8 The results show that the highest PC as a percentage of the AQAL at any discrete receptor is 22% (at Cooper Shore). The EPUK & IAQM impact descriptor for an increase between 20% and 50% is 'moderate adverse'. There is one other receptor where the impact descriptor is 'moderate adverse'. As such, the impacts at these locations are considered to be potentially significant.

1.2.9 With reference to the impacts at these locations, the Environment Agency's on-line guidance (DEFRA and EA, 2016) referred to in turn by the EPUK & IAQM guidance (2017) states that where the PCs exceed 10% of the AQAL, the impacts are not considered significant if the PEC is below the AQAL. The Environment Agency's on-line guidance continues by stating that:

"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration."

1.2.10 For all receptors, the PEC is less than 50% of the AQAL of 200 µg.m⁻³. This demonstrates that there is considerable headroom between the short-term AQAL and the PEC.

1.2.11 On that basis and using professional judgement, the overall significance of effect is considered to be minor adverse, which is not significant in EIA terms.

1.3 Scenario 3: 33 x 18.4 MW engines, each engine has its own stack (33 stacks)

Stack Locations

1.3.1 Table 1.5 outlines the modelled stack locations for Scenario 3.

Table 1.5: Stack Locations for Scenario 3.

Engine Number	X (m)	Y (m)
1	566405	176754
2	566389	176744
3	566393	176758
4	566397	176771
5	566401	176785
6	566405	176799
7	566409	176814
8	566412	176826
9	566416	176840
10	566428	176837
11	566424	176824
12	566421	176810

Engine Number	X (m)	Y (m)
13	566417	176796
14	566413	176782
15	566409	176768
16	566401	176740
17	566390	176701
18	566387	176688
19	566352	176608
20	566356	176622
21	566359	176635
22	566363	176649
23	566367	176663
24	566371	176677
25	566375	176691
26	566378	176704
27	566383	176674
28	566379	176660
29	566375	176646
30	566371	176631
31	566367	176618
32	566364	176604
33	566430	176845

Long-term Impacts

1.3.2 Table 1.6 summarise the long-term maximum Process Contribution (PC) and Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 1.6: Long-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 3.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	3.2	8	29.7	74	Slight

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
2	Sandhurst Road	26.4	2.2	6	28.7	72	Slight
3	School	34.0	1.1	3	35.2	88	Slight
4	Gateway Academy	28.7	0.5	1	29.2	73	Negligible
5	Gravel Pit Cottages	18.0	3.7	9	21.7	54	Slight
6	Princess Margaret Rd	18.0	2.0	5	20.1	50	Negligible
7	Walnut Tree Farm	18.3	4.5	11	22.8	57	Moderate
8	The Green	18.3	1.3	3	19.7	49	Negligible
9	West Street	41.8	0.5	1	42.4	106	Moderate
10	Milton School	30.9	0.4	1	31.3	78	Negligible
11	Royal Pier Road	31.8	0.5	1	32.3	81	Negligible
12	West Tilbury Hall	18.3	1.6	4	19.9	50	Negligible
13	Cooper Shore	18.3	2.5	6	20.8	52	Slight
14	R1	31.1	0.1	0	31.2	78	Negligible
15	R2	27.6	0.1	0	27.7	69	Negligible
16	R3	28.3	0.2	1	28.5	71	Negligible
17	R4	26.9	0.3	1	27.2	68	Negligible
18	R5	32.2	0.3	1	32.5	81	Negligible
19	R6	26.9	0.4	1	27.3	68	Negligible
20	R7	28.1	0.3	1	28.4	71	Negligible
21	R8	28.9	0.4	1	29.3	73	Negligible
22	R9	36.6	0.9	2	37.5	94	Slight
23	R10	30.6	1.1	3	31.7	79	Slight
24	R11	26.6	1.0	2	27.6	69	Negligible
25	R12	26.1	1.0	3	27.1	68	Negligible
26	R13	26.4	2.0	5	28.4	71	Negligible
27	R14	26.8	1.7	4	28.5	71	Negligible
28	R15	23.6	3.1	8	26.7	67	Slight

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
29	R16	25.8	1.2	3	27.0	68	Negligible
30	R17	26.2	1.1	3	27.3	68	Negligible
31	R18	24.1	0.2	1	24.3	61	Negligible
32	R19	31.6	1.1	3	32.7	82	Slight
33	R20	23.5	0.2	0	23.7	59	Negligible
34	R21	34.8	0.2	0	35.0	87	Negligible
35	R22	24.8	0.1	0	24.9	62	Negligible
36	R23	34.1	0.1	0	34.2	86	Negligible
37	R24	28.5	0.1	0	28.6	72	Negligible
38	R25	33.8	0.4	1	34.2	85	Negligible
39	R26	22.6	0.1	0	22.7	57	Negligible
40	R27	24.5	0.3	1	24.8	62	Negligible
41	16/01232/OUT	18.0	3.2	8	21.2	53	Slight
42	18/00664/CONDC	29.9	2.1	5	32.0	80	Slight
43	16/00412/OUT	18.3	0.6	1	18.9	47	Negligible
44	15/00379/OUT	18.3	0.5	1	18.8	47	Negligible
45	16/01475/SCR	29.9	1.3	3	31.2	78	Slight
46	GR/17/674	22.4	0.2	1	22.7	57	Negligible
47	20141214	38.6	0.2	1	38.9	97	Slight

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

Receptors in bold exceed the AQAL.

1.3.3 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all but one receptor. At West Street (receptor 9), the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse' for all receptors.

1.3.4 There are two receptors where the impact is 'moderate adverse': Walnut Tree Farm (receptor 7) and West Street (receptor 9). As stated in the footnote to Table 2.17 of Volume 3, Chapter 12: Air Quality, the EPUK & IAQM guidance (2017) makes it clear that:

“a moderate adverse impact at one receptor may not mean that the overall impact has a significant effect.”

1.3.5 With reference to the impacts at Walnut Tree Farm, the Environment Agency's on-line guidance (DEFRA and EA, 2016) states that:

“You don't need to take further action if your assessment has shown that both of the following apply:

- Your proposed emissions comply with BAT associated emission levels (AELs) or the equivalent requirements where there is not BAT AEL*
- ... the resulting PECs won't exceed environmental standards”.*

1.3.6 At Walnut Tree Farm the PEC is only 57% of the AQAL. This demonstrates that there is considerable headroom between the AQAL and the PEC.

1.3.7 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all receptors except West Street (receptor 9). At West Street, the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. The PEC with the development is 106% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 1.7: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

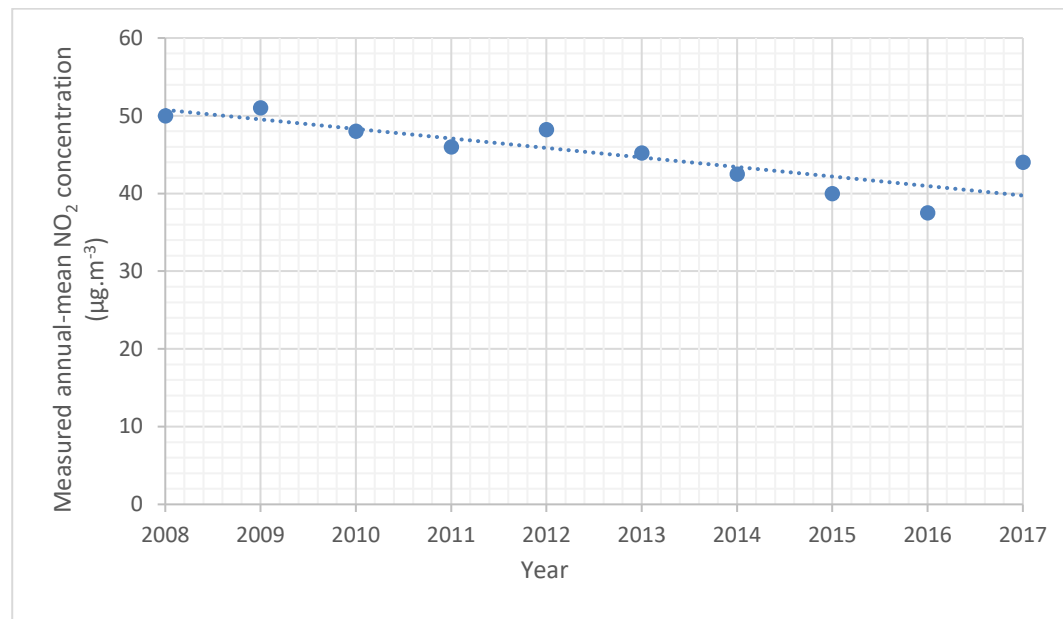


Figure 1.2: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

Table 1.8: Short-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 3.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	46.0	23	98.9	49	Moderate
2	Sandhurst Road	52.9	40.5	20	93.4	47	Slight
3	School	68.1	24.5	12	92.6	46	Slight
4	Gateway Academy	57.4	23.8	12	81.2	41	Slight
5	Gravel Pit Cottages	36.0	40.0	20	76.0	38	Slight
6	Princess Margaret Rd	36.0	28.2	14	64.2	32	Slight
7	Walnut Tree Farm	36.7	65.2	33	101.9	51	Moderate
8	The Green	36.7	42.4	21	79.0	40	Moderate
9	West Street	83.7	21.8	11	105.5	53	Slight
10	Milton School	61.7	21.3	11	83.0	42	Slight
11	Royal Pier Road	63.6	22.7	11	86.3	43	Slight
12	West Tilbury Hall	36.7	49.4	25	86.1	43	Moderate
13	Cooper Shore	36.7	66.3	33	103.0	51	Moderate
14	R1	62.2	8.9	4	71.1	36	Negligible
15	R2	55.2	8.2	4	63.4	32	Negligible
16	R3	56.6	15.4	8	72.0	36	Negligible
17	R4	53.8	13.2	7	67.0	33	Negligible
18	R5	64.4	13.2	7	77.6	39	Negligible
19	R6	53.8	15.1	8	68.9	34	Negligible
20	R7	56.2	16.0	8	72.2	36	Negligible
21	R8	57.8	17.4	9	75.2	38	Negligible
22	R9	73.2	21.4	11	94.6	47	Slight
23	R10	61.2	24.4	12	85.6	43	Slight
24	R11	53.2	27.6	14	80.8	40	Slight
25	R12	52.2	28.3	14	80.5	40	Slight
26	R13	52.8	39.0	19	91.8	46	Slight

1.3.8 The results show at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is a conservative assumption and, in reality, the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and so concentrations are expected to decrease even further

1.3.9 If the AC at West Street is assumed to be 37.5 µg.m⁻³ (the measured concentration in 2016), the PEC is only 95% of the AQAL and, based on the Environment Agency's on-line guidance, further action would not be required. Further analysis of air quality in Gravesend is provided in Volume 6 Appendix 12.8 Further Analysis of Air Quality in Gravesend.

1.3.10 On that basis and using professional judgement, the overall significance of effect is considered to be **minor adverse**, which is not significant in EIA terms.

Short-term Impacts

1.3.11 Table 1.8 summarise the short-term maximum PC and PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
27	R14	53.6	35.4	18	89.0	45	Slight
28	R15	47.2	45.7	23	92.9	46	Moderate
29	R16	51.6	31.4	16	83.0	41	Slight
30	R17	52.4	30.2	15	82.6	41	Slight
31	R18	48.2	16.5	8	64.7	32	Negligible
32	R19	63.2	24.8	12	88.0	44	Slight
33	R20	47.0	10.8	5	57.8	29	Negligible
34	R21	69.6	10.5	5	80.1	40	Negligible
35	R22	49.6	8.9	4	58.5	29	Negligible
36	R23	68.2	8.3	4	76.5	38	Negligible
37	R24	57.0	10.6	5	67.6	34	Negligible
38	R25	67.6	11.7	6	79.3	40	Negligible
39	R26	45.2	11.2	6	56.4	28	Negligible
40	R27	49.0	15.7	8	64.7	32	Negligible
41	16/01232/OUT	36.0	37.3	19	73.3	37	Slight
42	18/00664/CONDC	59.8	28.9	14	88.7	44	Slight
43	16/00412/OUT	36.7	28.4	14	65.1	33	Slight
44	15/00379/OUT	36.7	24.8	12	61.5	31	Slight
45	16/01475/SCR	59.8	24.9	12	84.7	42	Slight
46	GR/17/674	44.8	13.6	7	58.4	29	Negligible
47	20141214	77.3	12.5	6	89.7	45	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

1.3.12 The results show that the highest PC as a percentage of the AQAL at any discrete receptor is 33%. The EPUK & IAQM impact descriptor for an increase between 20 and 50% is 'moderate adverse'. There are six receptors where the impact descriptor is 'moderate adverse'. As such, the impacts at these locations are considered to be potentially significant.

1.3.13 With reference to the impacts at these locations, the Environment Agency's on-line guidance referred to in turn by the EPUK & IAQM (2017) guidance states that where the PCs exceed 10% of the AQAL, the impacts are not considered significant if the PEC is below the AQAL. The Environment Agency's on-line guidance (DEFRA and EA, 2016) continues by stating that;

"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration."

1.3.14 For all receptors the PEC is less 55% of the AQAL of 200 µg.m⁻³. On that basis and using professional judgement, the overall significance of effect is considered to be **minor adverse**, which is not significant in EIA terms.

1.4 Scenario 4: 33 x 18.4 MW engines, aggregated stacks of 6 groups of five engines per stack and one group of three engines per stack (7 stacks)

Stack Locations

1.4.1 Table 1.9 outlines the modelled stack locations for Scenario 4.

Table 1.9: Stack Locations for Scenario 4.

Engine Number	X (m)	Y (m)
1	566406	176784
2	566421	176842
3	566415	176812
4	566398	176756
5	566380	176688
6	566374	176661
7	566365	176633

Long-term Impacts

1.4.2 Table 1.10 summarise the long-term maximum Process Contribution (PC) and Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 1.10: Long-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 4.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	1.7	4	28.1	70	Negligible
2	Sandhurst Road	26.4	1.2	3	27.6	69	Negligible
3	School	34.0	0.6	2	34.7	87	Slight
4	Gateway Academy	28.7	0.2	1	28.9	72	Negligible
5	Gravel Pit Cottages	18.0	2.1	5	20.1	50	Negligible
6	Princess Margaret Rd	18.0	1.1	3	19.1	48	Negligible
7	Walnut Tree Farm	18.3	2.1	5	20.4	51	Negligible
8	The Green	18.3	0.6	2	18.9	47	Negligible
9	West Street	41.8	0.3	1	42.2	105	Moderate
10	Milton School	30.9	0.2	1	31.1	78	Negligible
11	Royal Pier Road	31.8	0.3	1	32.1	80	Negligible
12	West Tilbury Hall	18.3	0.7	2	19.0	48	Negligible
13	Cooper Shore	18.3	1.1	3	19.5	49	Negligible
14	R1	31.1	0.1	0	31.2	78	Negligible
15	R2	27.6	0.1	0	27.7	69	Negligible
16	R3	28.3	0.1	0	28.4	71	Negligible
17	R4	26.9	0.2	0	27.1	68	Negligible
18	R5	32.2	0.2	0	32.4	81	Negligible
19	R6	26.9	0.2	1	27.1	68	Negligible
20	R7	28.1	0.2	0	28.3	71	Negligible
21	R8	28.9	0.2	1	29.1	73	Negligible
22	R9	36.6	0.5	1	37.1	93	Negligible
23	R10	30.6	0.6	2	31.2	78	Slight
24	R11	26.6	0.5	1	27.1	68	Negligible
25	R12	26.1	0.6	1	26.7	67	Negligible
26	R13	26.4	1.1	3	27.5	69	Negligible

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
27	R14	26.8	0.9	2	27.7	69	Negligible
28	R15	23.6	1.6	4	25.2	63	Negligible
29	R16	25.8	0.7	2	26.5	66	Negligible
30	R17	26.2	0.6	2	26.8	67	Negligible
31	R18	24.1	0.1	0	24.2	61	Negligible
32	R19	31.6	0.7	2	32.3	81	Slight
33	R20	23.5	0.1	0	23.6	59	Negligible
34	R21	34.8	0.1	0	34.9	87	Negligible
35	R22	24.8	0.1	0	24.9	62	Negligible
36	R23	34.1	0.1	0	34.2	85	Negligible
37	R24	28.5	0.1	0	28.6	71	Negligible
38	R25	33.8	0.2	1	34.0	85	Negligible
39	R26	22.6	0.1	0	22.7	57	Negligible
40	R27	24.5	0.2	0	24.7	62	Negligible
41	16/01232/OUT	18.0	1.8	4	19.8	49	Negligible
42	18/00664/CONDC	29.9	1.2	3	31.1	78	Slight
43	16/00412/OUT	18.3	0.3	1	18.6	46	Negligible
44	15/00379/OUT	18.3	0.2	1	18.6	46	Negligible
45	16/01475/SCR	29.9	0.8	2	30.7	77	Slight
46	GR/17/674	22.4	0.2	0	22.6	56	Negligible
47	20141214	38.6	0.2	0	38.8	97	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

Receptors in bold exceed the AQAL.

1.4.3 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all but one receptor. At West Street (receptor 9), the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse' for all receptors.

1.4.4 There is one receptor where the impact is 'moderate adverse': West Street (receptor 9). As stated in the footnote to Table 2.17 of Volume 3, Chapter 12: Air Quality, the EPUK & IAQM (2017) guidance makes it clear that:

“a moderate adverse impact at one receptor may not mean that the overall impact has a significant effect.”

1.4.5 At West Street, the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. The PEC with the development is 107% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 1.11: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

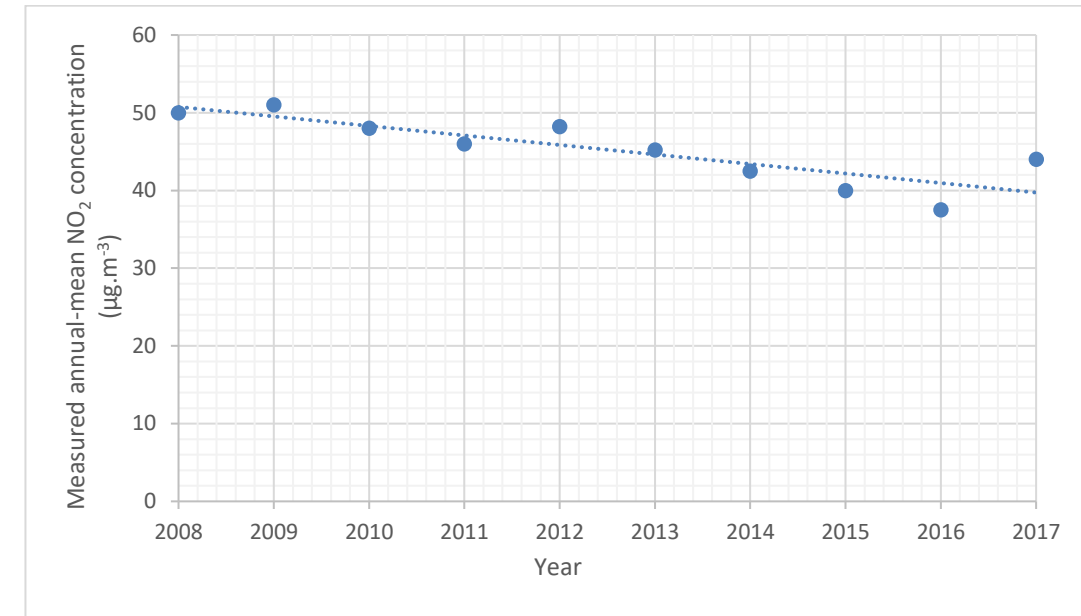


Figure 1.3: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

1.4.6 The results show at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is a conservative assumption and in reality the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and so concentrations are expected to decrease even further.

1.4.7 If the AC at West Street is assumed to be 37.5 µg.m⁻³ (the measured concentration in 2016), the PEC is only 95% of the AQAL and, based on the Environment Agency's on-line guidance, further action would not be required. Further analysis of air quality in Gravesend is provided in Volume 6 Appendix 12.8 Further Analysis of Air Quality in Gravesend.

1.4.8 On that basis and using professional judgement, the overall significance of effect is considered to be **minor adverse**, which is not significant in EIA terms.

Short-term Impacts

1.4.9 Table 1.12 summarise the short-term maximum PC and PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 1.12: Short-term Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 4.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	26.8	13	79.6	40	Slight
2	Sandhurst Road	52.9	22.5	11	75.4	38	Slight
3	School	68.1	12.7	6	80.7	40	Negligible
4	Gateway Academy	57.4	11.6	6	69.0	34	Negligible
5	Gravel Pit Cottages	36.0	22.6	11	58.6	29	Slight
6	Princess Margaret Rd	36.0	14.1	7	50.1	25	Negligible
7	Walnut Tree Farm	36.7	37.2	19	73.8	37	Slight
8	The Green	36.7	23.2	12	59.9	30	Slight
9	West Street	75.0	11.5	6	95.2	48	Negligible
10	Milton School	61.7	11.4	6	73.2	37	Negligible
11	Royal Pier Road	63.6	11.8	6	75.4	38	Negligible
12	West Tilbury Hall	36.7	27.8	14	64.4	32	Slight
13	Cooper Shore	36.7	38.4	19	75.1	38	Slight
14	R1	62.2	4.0	2	66.2	33	Negligible
15	R2	55.2	4.1	2	59.3	30	Negligible
16	R3	56.6	6.0	3	62.6	31	Negligible
17	R4	53.8	7.6	4	61.4	31	Negligible
18	R5	64.4	6.9	3	71.3	36	Negligible
19	R6	53.8	8.8	4	62.6	31	Negligible
20	R7	56.2	8.3	4	64.5	32	Negligible
21	R8	57.8	9.7	5	67.5	34	Negligible
22	R9	73.2	11.9	6	85.1	43	Negligible
23	R10	61.2	12.9	6	74.1	37	Negligible
24	R11	53.2	13.1	7	66.3	33	Negligible
25	R12	52.2	13.4	7	65.6	33	Negligible
26	R13	52.8	21.4	11	74.2	37	Slight

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
27	R14	53.6	18.9	9	72.5	36	Negligible
28	R15	47.2	26.1	13	73.3	37	Slight
29	R16	51.6	15.0	8	66.6	33	Negligible
30	R17	52.4	14.0	7	66.4	33	Negligible
31	R18	48.2	6.5	3	54.7	27	Negligible
32	R19	63.2	12.6	6	75.8	38	Negligible
33	R20	47.0	5.7	3	52.7	26	Negligible
34	R21	69.6	5.5	3	75.1	38	Negligible
35	R22	49.6	3.8	2	53.4	27	Negligible
36	R23	68.2	3.6	2	71.8	36	Negligible
37	R24	57.0	4.8	2	61.8	31	Negligible
38	R25	67.6	6.9	3	74.5	37	Negligible
39	R26	45.2	4.9	2	50.1	25	Negligible
40	R27	49.0	8.5	4	57.5	29	Negligible
41	16/01232/OUT	36.0	19.7	10	55.8	28	Negligible
42	18/00664/CONDC	59.8	14.0	7	73.8	37	Negligible
43	16/00412/OUT	36.7	13.2	7	49.8	25	Negligible
44	15/00379/OUT	36.7	11.7	6	48.3	24	Negligible
45	16/01475/SCR	59.8	12.3	6	72.1	36	Negligible
46	GR/17/674	44.8	7.3	4	52.2	26	Negligible
47	20141214	77.3	7.6	4	84.9	42	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

1.4.10 The results show that the highest PC as a percentage of the AQAL at any discrete receptor is 19%. The EPUK & IAQM impact descriptor for an increase between 10 and 20% is 'slight adverse'. There are nine receptors where the impact descriptor is 'slight adverse' and at all other receptors the impact descriptor is "negligible".

- 1.4.11 On that basis and using professional judgement, the overall significance of effect is considered to be **minor adverse**, which is not significant in EIA terms.

2. Cumulative Effects Assessment

2.1 Scenario 2: 48 x 12.4 MW engines, 4 engines per stack (12 Stacks)

Long-term Impacts

- 2.1.1 Table 2.1 summarises the long-term maximum Process Contribution (PC) and the Cumulative Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK& I AQM impact descriptors are also shown.

Table 2.1: Long-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors –Scenario 2.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	Thurrock Flexible Generation Plant PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative PEC (µg.m ⁻³)	Cumulative PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	2.2	5	0.6	-	0.27	1.23	0.01	0.15	<0.005	30.9	77	Slight
2	Sandhurst Road	26.4	1.6	4	3	-	0.26	1.23	0.01	0.14	<0.005	32.7	82	Slight
3	School	34.0	0.8	2	0.9	-	0.31	0.35	0.01	0.13	0.01	36.6	91	Slight
4	Gateway Academy	28.7	0.3	1	-	0.6	0.70	0.24	0.01	0.17	<0.005	30.7	77	Negligible
5	Gravel Pit Cottages	18.0	2.6	7	-	1.0	0.28	0.44	0.01	0.18	<0.005	22.6	56	Slight
6	Princess Margaret Rd	18.0	1.4	4	-	-	0.21	0.32	0.01	0.19	<0.005	20.2	50	Negligible
7	Walnut Tree Farm	18.3	2.6	7	-	1.0	0.33	0.65	0.01	0.17	<0.005	23.1	58	Slight
8	The Green	18.3	0.8	2	-	-	0.45	0.40	0.01	0.18	<0.005	20.2	50	Negligible
9	West Street	41.8	0.4	1	-	-	0.14	0.26	0.01	0.12	<0.005	42.8	107	Moderate
10	Milton School	30.9	0.3	1	-	-	0.12	0.18	0.01	0.12	<0.005	31.6	79	Negligible
11	Royal Pier Road	31.8	0.4	1	-	-	0.14	0.24	0.01	0.12	<0.005	32.7	82	Negligible
12	West Tilbury Hall	18.3	1.0	2	-	-	0.42	0.48	0.01	0.18	<0.005	20.4	51	Negligible
13	Cooper Shore	18.3	1.5	4	-	-	0.36	0.65	0.01	0.17	<0.005	21.0	53	Negligible
14	R1	31.1	0.1	0	0.1	-	0.09	0.04	0.01	0.17	0.06	31.6	79	Negligible
15	R2	27.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.17	0.04	28.0	70	Negligible
16	R3	28.3	0.2	0	0.4	-	0.14	0.06	0.01	0.23	0.01	28.9	72	Negligible
17	R4	26.9	0.2	0	0.5	-	0.31	0.13	0.01	0.27	0.01	27.8	70	Negligible
18	R5	32.2	0.2	1	0.3	-	0.29	0.13	0.01	0.28	0.01	33.1	83	Negligible
19	R6	26.9	0.3	1	0.1	2.1	0.36	0.11	0.01	0.31	0.01	30.1	75	Negligible
20	R7	28.1	0.2	1	0.8	0.9	0.53	0.17	0.01	0.25	0.01	30.2	75	Negligible
21	R8	28.9	0.3	1	0.8	0.1	1.06	0.14	0.01	0.15	0.01	30.6	77	Negligible
22	R9	36.6	0.7	2	1.9	-	0.41	0.21	0.01	0.14	0.01	38.0	95	Moderate
23	R10	30.6	0.8	2	4.4	-	0.29	0.41	0.01	0.13	0.01	32.2	81	Slight
24	R11	26.6	0.7	2	1.7	-	0.24	0.79	0.01	0.13	<0.005	28.5	71	Negligible
25	R12	26.1	0.7	2	1.7	-	0.24	0.92	0.01	0.13	<0.005	28.1	70	Negligible

Receptor ID	Receptor Name	AC ($\mu\text{g}\cdot\text{m}^{-3}$) [*]	Thurrock Flexible Generation Plant PC ($\mu\text{g}\cdot\text{m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Lower Thames Crossing PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Cumulative PEC ($\mu\text{g}\cdot\text{m}^{-3}$)	Cumulative PEC as % of AQAL	Impact Descriptor
26	R13	26.4	1.5	4	3.0	-	0.26	1.14	0.01	0.14	<0.005	29.4	74	Negligible
27	R14	26.8	1.2	3	3.8	-	0.26	1.14	0.01	0.14	<0.005	29.6	74	Negligible
28	R15	23.6	2.2	5	0.6	-	0.25	1.50	0.01	0.14	<0.005	27.7	69	Negligible
29	R16	25.8	0.9	2	1.8	-	0.25	1.24	0.01	0.13	<0.005	28.3	71	Negligible
30	R17	26.2	0.8	2	2.1	-	0.24	1.18	0.01	0.13	<0.005	28.6	71	Negligible
31	R18	24.1	0.2	0	0.2	-	0.16	0.08	0.01	0.24	0.01	24.8	62	Negligible
32	R19	31.6	0.8	2	0.9	-	0.32	0.34	0.01	0.13	0.01	33.3	83	Slight
33	R20	23.5	0.1	0	0.1	-	0.14	0.05	0.01	0.22	0.02	24.1	60	Negligible
34	R21	34.8	0.1	0	0.5	-	0.12	0.05	0.01	0.20	0.02	35.3	88	Negligible
35	R22	24.8	0.1	0	<0.05	-	0.08	0.04	0.01	0.16	0.08	25.3	63	Negligible
36	R23	34.1	0.1	0	0.1	-	0.07	0.03	0.01	0.15	0.04	34.5	86	Negligible
37	R24	28.5	0.1	0	0.1	-	0.08	0.03	0.01	0.12	0.02	28.9	72	Negligible
38	R25	33.8	0.3	1	0.1	2.0	0.23	0.09	0.02	0.34	0.01	36.8	92	Negligible
39	R26	22.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.11	0.01	22.9	57	Negligible
40	R27	24.5	0.2	1	0.3	0.9	0.52	0.17	0.01	0.25	0.01	26.6	66	Negligible
41	16/01232/OUT	18.0	2.2	5	-	2.1	0.34	0.44	0.01	0.19	<0.005	23.2	58	Negligible
42	18/00664/CONDC	29.9	1.5	4	-	-	0.31	0.31	0.01	0.20	<0.005	32.3	81	Slight
43	16/00412/OUT	18.3	0.4	1	-	0.4	0.56	0.31	0.01	0.18	<0.005	20.1	50	Negligible
44	15/00379/OUT	18.3	0.3	1	-	0.4	0.58	0.28	0.01	0.19	<0.005	20.1	50	Negligible
45	16/01475/SCR	29.9	0.9	2	-	-	0.32	0.26	<0.005	0.24	<0.005	31.7	79	Slight
46	GR/17/674	22.4	0.2	0	-	1.1	0.09	0.08	<0.005	0.10	<0.005	24.0	60	Negligible
47	20141214	38.6	0.2	0	-	1.1	0.09	0.07	<0.005	0.10	<0.005	40.2	101	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2. Receptors in bold exceed the AQAL.

- 2.1.2 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all but two receptors. At West Street (receptor 9) the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. At receptor 47 (20141214), the AQS objective is exceeded with the cumulative developments. The PC from Thurrock Flexible Generation Plant at this receptor is only 1% of the AQS objective and the biggest contribution is from the Tilbury2 development.
- 2.1.3 When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse' for all receptors.
- 2.1.4 There is one receptor where the cumulative impact is 'moderate adverse': West Street (receptor 9).
- 2.1.5 At West Street, the cumulative impact descriptor is 'moderate adverse' and the cumulative PEC is 107% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 2.2: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

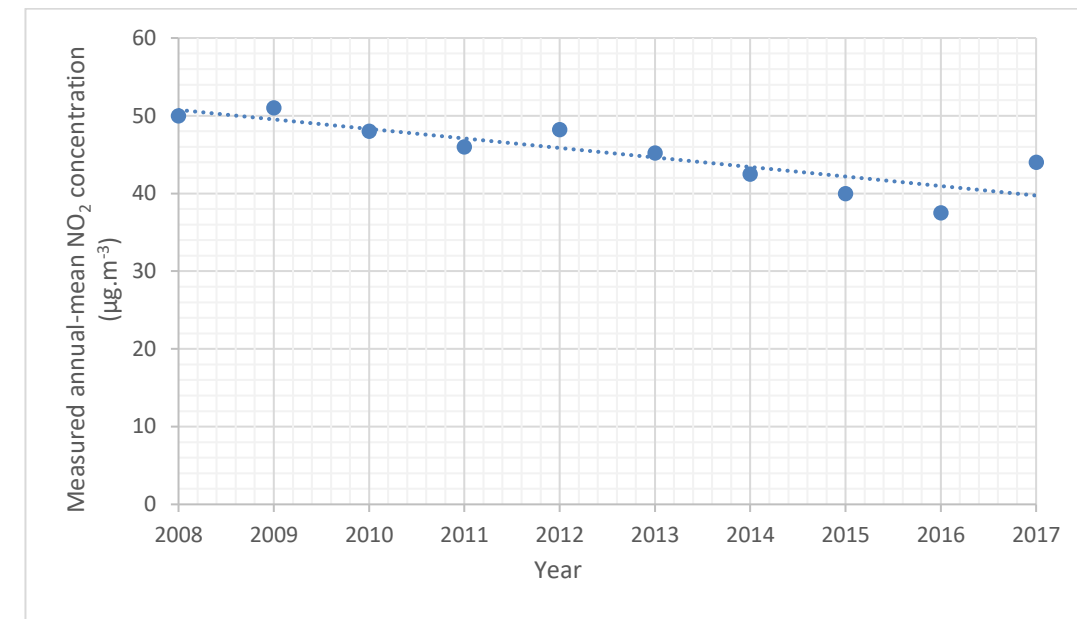


Figure 2.1: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

- 2.1.6 The results show that at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is likely to be a conservative assumption and in reality the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and the opening years of some of the other cumulative developments are likely to be even later so concentrations are expected to decrease even further.
- 2.1.7 If the AC at West Street is assumed to be 37.5 µg.m⁻³, the PEC is only 96% of the AQAL and based on the Environment Agency's on-line guidance (DEFRA and EA, 2016) further action would not be required.
- 2.1.8 As discussed in Volume 4, Chapter 25: Air Quality, other smaller cumulative developments will generate traffic which could increase concentrations of NO₂.
- 2.1.9 There are five receptors where the Cumulative PEC is greater than 90% of the AQAL; receptors 3, 9, 22, 38 and 47.

- 2.1.10 Section 2.5 of Volume 3, Chapter 12: Air Quality provides an analysis of the sources of uncertainty in the results of the assessment. The conclusion of that analysis was that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.
- 2.1.11 Similarly a number of maximum design parameters were assessed It should be noted that the results presented in this chapter are worst-case and based on a number of conservative assumptions. In reality, it is unlikely that all the maximum design parameters will be implemented.
- 2.1.12 In particular, SCR will be implemented and the Thurrock Flexible Generation Plant PCs are likely to more than halve.
- 2.1.13 On that basis and using professional judgement, the overall significance of the long-term cumulative effect is considered to be minor adverse.

Short-term Impacts

- 2.1.14 Table 2.3 summarises the short-term maximum PC and cumulative PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown. For the short-term Cumulative PEC, the Thurrock Flexible Generation Plant PC has been added to the Cumulative AC and the short-term PC for Tilbury Green Power, Tilbury Peak Reserve, Thames Enterprise Park, Gateway Energy Centre and Purfleet Regeneration Centre. The cumulative AC has been calculated by adding the short-term PCs of the above cumulative developments to the doubled AC, Tilbury2 PC and Lower Thames Crossing PC. This follows the Environment Agency's on-line guidance (DEFRA and EA, 2016) which states that: *"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration."*

Table 2.3: Short-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 2.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)*	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative AC (µg.m ⁻³)	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	33.0	16	0.6	-	5.10	15.98	0.21	3.44	0.12	78.9	111.9	56	Slight
2	Sandhurst Road	52.9	28.7	14	3.0	-	4.85	19.45	0.19	3.26	0.13	86.8	115.4	58	Slight
3	School	68.1	17.3	9	0.9	-	5.61	6.41	0.18	2.83	0.15	85.0	102.3	51	Negligible
4	Gateway Academy	57.4	15.0	7	-	0.6	6.76	4.82	0.24	3.16	0.14	73.7	88.7	44	Negligible
5	Gravel Pit Cottages	36.0	26.8	13	-	1.0	4.12	4.74	0.23	4.14	0.09	51.3	78.1	39	Slight
6	Princess Margaret Rd	36.0	18.3	9	-	-	3.16	4.09	0.22	4.37	0.08	47.9	66.3	33	Negligible
7	Walnut Tree Farm	36.7	42.3	21	-	1.0	4.48	6.02	0.22	4.12	0.10	53.6	95.9	48	Moderate
8	The Green	36.7	27.4	14	-	-	5.35	5.82	0.23	3.94	0.12	52.1	79.5	40	Slight
9	West Street	83.7	16.3	8	-	-	3.84	7.70	0.15	2.77	0.11	98.3	114.5	57	Negligible
10	Milton School	61.7	15.0	8	-	-	3.43	6.11	0.14	2.83	0.10	74.3	89.4	45	Negligible
11	Royal Pier Road	63.6	15.7	8	-	-	3.75	7.04	0.15	2.78	0.11	77.4	93.1	47	Negligible
12	West Tilbury Hall	36.7	32.9	16	-	-	5.32	6.31	0.23	3.74	0.11	52.4	85.3	43	Slight
13	Cooper Shore	36.7	44.2	22	-	-	4.73	6.86	0.23	3.73	0.10	52.3	96.5	48	Moderate
14	R1	62.2	5.3	3	0.1	-	2.93	1.82	0.17	2.69	0.43	70.2	75.6	38	Negligible
15	R2	55.2	5.1	3	0.0	-	2.08	1.48	0.20	2.62	0.38	62.0	67.1	34	Negligible
16	R3	56.6	9.6	5	0.4	-	2.74	2.16	0.24	3.49	0.20	65.4	75.0	38	Negligible
17	R4	53.8	9.4	5	0.5	-	3.22	3.48	0.27	4.40	0.16	65.3	74.7	37	Negligible
18	R5	64.4	9.5	5	0.3	-	3.03	3.34	0.27	4.25	0.16	75.5	85.0	42	Negligible
19	R6	53.8	11.1	6	0.1	2.1	3.23	3.50	0.28	4.64	0.14	69.8	80.9	40	Negligible
20	R7	56.2	10.5	5	0.8	0.9	3.87	4.23	0.27	4.68	0.15	71.2	81.7	41	Negligible
21	R8	57.8	12.0	6	0.8	0.1	8.81	4.50	0.22	2.89	0.13	74.5	86.6	43	Negligible
22	R9	73.2	16.1	8	1.9	-	7.01	5.04	0.19	3.04	0.16	88.6	104.7	52	Negligible
23	R10	61.2	17.7	9	4.4	-	5.45	7.06	0.18	3.02	0.15	77.1	94.7	47	Negligible
24	R11	53.2	18.9	9	1.7	-	4.85	9.31	0.18	3.03	0.14	70.7	89.6	45	Negligible
25	R12	52.2	18.6	9	1.7	-	4.84	10.12	0.17	3.03	0.14	70.5	89.1	45	Negligible
26	R13	52.8	27.1	14	3.0	-	4.93	19.32	0.19	3.23	0.13	80.6	107.7	54	Slight

Receptor ID	Receptor Name	AC ($\mu\text{g}\cdot\text{m}^{-3}$)*	PC ($\mu\text{g}\cdot\text{m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g}\cdot\text{m}^{-3}$)*	Lower Thames Crossing PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Cumulative AC ($\mu\text{g}\cdot\text{m}^{-3}$)	PEC ($\mu\text{g}\cdot\text{m}^{-3}$)	PEC as % of AQAL	Impact Descriptor
27	R14	53.6	24.6	12	3.8	-	4.78	18.07	0.18	3.21	0.13	80.0	104.5	52	Slight
28	R15	47.2	32.8	16	0.6	-	5.03	19.13	0.20	3.39	0.12	75.1	107.9	54	Slight
29	R16	51.6	20.2	10	1.8	-	5.16	13.99	0.18	3.13	0.14	74.2	94.4	47	Negligible
30	R17	52.4	20.3	10	2.1	-	4.86	11.92	0.17	3.10	0.14	72.6	92.8	46	Negligible
31	R18	48.2	9.6	5	0.2	-	2.85	2.34	0.25	3.74	0.18	57.6	67.1	34	Negligible
32	R19	63.2	17.5	9	0.9	-	5.62	6.00	0.18	2.78	0.15	77.9	95.4	48	Negligible
33	R20	47.0	7.7	4	0.1	-	3.71	2.07	0.22	3.46	0.22	56.7	64.3	32	Negligible
34	R21	69.6	6.8	3	0.5	-	3.61	2.12	0.21	3.38	0.23	79.1	85.9	43	Negligible
35	R22	49.6	5.3	3	<0.05	-	2.70	1.68	0.17	2.63	0.58	57.4	62.7	31	Negligible
36	R23	68.2	5.1	3	0.1	-	1.98	1.34	0.17	2.35	0.58	74.6	79.7	40	Negligible
37	R24	57.0	7.5	4	0.1	-	1.86	1.17	0.20	2.58	0.29	63.1	70.6	35	Negligible
38	R25	67.6	8.5	4	0.1	2.0	2.38	2.43	0.39	5.54	0.11	82.5	91.0	45	Negligible
39	R26	45.2	7.7	4	<0.05	-	1.67	1.16	0.19	2.57	0.25	51.0	58.7	29	Negligible
40	R27	49.0	10.4	5	0.3	0.9	3.67	4.16	0.27	4.75	0.16	63.8	74.2	37	Negligible
41	16/01232/OUT	36.0	24.0	12	-	2.1	4.64	5.00	0.23	4.29	0.10	54.5	78.5	39	Slight
42	18/00664/CONDC	59.8	18.6	9	-	-	4.32	4.69	0.24	4.57	0.10	73.7	92.4	46	Negligible
43	16/00412/OUT	36.7	17.1	9	-	0.4	5.87	5.45	0.26	3.43	0.13	52.6	69.7	35	Negligible
44	15/00379/OUT	36.7	15.5	8	-	0.4	5.82	5.28	0.26	3.72	0.13	52.7	68.2	34	Negligible
45	16/01475/SCR	59.8	16.1	8	-	-	4.05	4.08	0.29	4.87	0.11	73.2	89.3	45	Negligible
46	GR/17/674	44.8	9.3	5	-	1.1	2.80	3.41	0.13	2.56	0.11	56.0	65.3	33	Negligible
47	20141214	77.3	8.8	4	-	1.1	2.75	3.33	0.13	2.58	0.11	88.4	97.2	49	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

2.1.15 For all receptors the cumulative PEC is less than 60% of the AQAL of 200 $\mu\text{g.m}^{-3}$. This demonstrates that there is considerable headroom between the short-term AQAL and the PEC. On that basis and using professional judgement, the short-term cumulative effect is considered to be minor adverse.

2.2 Scenario 3: 33 x 18.4 MW engines, each engine has its own stack (33 stacks)

Long-term Impacts

2.2.1 Table 2.4 summarises the long-term maximum Process Contribution (PC) and the Cumulative Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 2.4: Long-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors –Scenario 3.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	Thurrock Flexible Generation Plant PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative PEC (µg.m ⁻³)	Cumulative PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	3.2	8	0.6	-	0.27	1.23	0.01	0.15	<0.005	31.9	80	Moderate
2	Sandhurst Road	26.4	2.2	6	3	-	0.26	1.23	0.01	0.14	<0.005	33.3	83	Moderate
3	School	34.0	1.1	3	0.9	-	0.31	0.35	0.01	0.13	0.01	36.9	92	Slight
4	Gateway Academy	28.7	0.5	1	-	0.6	0.70	0.24	0.01	0.17	<0.005	30.9	77	Negligible
5	Gravel Pit Cottages	18.0	3.7	9	-	1.0	0.28	0.44	0.01	0.18	<0.005	23.6	59	Slight
6	Princess Margaret Rd	18.0	2.0	5	-	-	0.21	0.32	0.01	0.19	<0.005	20.8	52	Negligible
7	Walnut Tree Farm	18.3	4.5	11	-	1.0	0.33	0.65	0.01	0.17	<0.005	25.0	62	Moderate
8	The Green	18.3	1.3	3	-	-	0.45	0.40	0.01	0.18	<0.005	20.7	52	Negligible
9	West Street	41.8	0.5	1	-	-	0.14	0.26	0.01	0.12	<0.005	42.9	107	Moderate
10	Milton School	30.9	0.4	1	-	-	0.12	0.18	0.01	0.12	<0.005	31.7	79	Negligible
11	Royal Pier Road	31.8	0.5	1	-	-	0.14	0.24	0.01	0.12	<0.005	32.8	82	Negligible
12	West Tilbury Hall	18.3	1.6	4	-	-	0.42	0.48	0.01	0.18	<0.005	21.0	53	Negligible
13	Cooper Shore	18.3	2.5	6	-	-	0.36	0.65	0.01	0.17	<0.005	22.0	55	Slight
14	R1	31.1	0.1	0	0.1	-	0.09	0.04	0.01	0.17	0.06	31.6	79	Negligible
15	R2	27.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.17	0.04	28.0	70	Negligible
16	R3	28.3	0.2	1	0.4	-	0.14	0.06	0.01	0.23	0.01	29.0	72	Negligible
17	R4	26.9	0.3	1	0.5	-	0.31	0.13	0.01	0.27	0.01	27.9	70	Negligible
18	R5	32.2	0.3	1	0.3	-	0.29	0.13	0.01	0.28	0.01	33.2	83	Negligible
19	R6	26.9	0.4	1	0.1	2.1	0.36	0.11	0.01	0.31	0.01	30.2	75	Negligible
20	R7	28.1	0.3	1	0.8	0.9	0.53	0.17	0.01	0.25	0.01	30.3	76	Negligible
21	R8	28.9	0.4	1	0.8	0.1	1.06	0.14	0.01	0.15	0.01	30.7	77	Negligible
22	R9	36.6	0.9	2	1.9	-	0.41	0.21	0.01	0.14	0.01	38.2	96	Moderate
23	R10	30.6	1.1	3	4.4	-	0.29	0.41	0.01	0.13	0.01	32.5	81	Slight
24	R11	26.6	1.0	2	1.7	-	0.24	0.79	0.01	0.13	<0.005	28.8	72	Negligible
25	R12	26.1	1.0	3	1.7	-	0.24	0.92	0.01	0.13	<0.005	28.4	71	Negligible

Receptor ID	Receptor Name	AC ($\mu\text{g.m}^{-3}$)*	Thurrock Flexible Generation Plant PC ($\mu\text{g.m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g.m}^{-3}$)	Lower Thames Crossing PC ($\mu\text{g.m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g.m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g.m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g.m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g.m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g.m}^{-3}$)	Cumulative PEC ($\mu\text{g.m}^{-3}$)	Cumulative PEC as % of AQAL	Impact Descriptor
26	R13	26.4	2.0	5	3.0	-	0.26	1.14	0.01	0.14	<0.005	30.0	75	Negligible
27	R14	26.8	1.7	4	3.8	-	0.26	1.14	0.01	0.14	<0.005	30.0	75	Negligible
28	R15	23.6	3.1	8	0.6	-	0.25	1.50	0.01	0.14	<0.005	28.6	71	Slight
29	R16	25.8	1.2	3	1.8	-	0.25	1.24	0.01	0.13	<0.005	28.6	72	Negligible
30	R17	26.2	1.1	3	2.1	-	0.24	1.18	0.01	0.13	<0.005	28.9	72	Negligible
31	R18	24.1	0.2	1	0.2	-	0.16	0.08	0.01	0.24	0.01	24.8	62	Negligible
32	R19	31.6	1.1	3	0.9	-	0.32	0.34	0.01	0.13	0.01	33.5	84	Slight
33	R20	23.5	0.2	0	0.1	-	0.14	0.05	0.01	0.22	0.02	24.1	60	Negligible
34	R21	34.8	0.2	0	0.5	-	0.12	0.05	0.01	0.20	0.02	35.4	88	Negligible
35	R22	24.8	0.1	0	<0.05	-	0.08	0.04	0.01	0.16	0.08	25.3	63	Negligible
36	R23	34.1	0.1	0	0.1	-	0.07	0.03	0.01	0.15	0.04	34.5	86	Negligible
37	R24	28.5	0.1	0	0.1	-	0.08	0.03	0.01	0.12	0.02	28.9	72	Negligible
38	R25	33.8	0.4	1	0.1	2.0	0.23	0.09	0.02	0.34	0.01	36.9	92	Negligible
39	R26	22.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.11	0.01	23.0	57	Negligible
40	R27	24.5	0.3	1	0.3	0.9	0.52	0.17	0.01	0.25	0.01	26.7	67	Negligible
41	16/01232/OUT	18.0	3.2	8	-	2.1	0.34	0.44	0.01	0.19	<0.005	24.3	61	Slight
42	18/00664/CONDC	29.9	2.1	5	-	-	0.31	0.31	0.01	0.20	<0.005	32.8	82	Slight
43	16/00412/OUT	18.3	0.6	1	-	0.4	0.56	0.31	0.01	0.18	<0.005	20.4	51	Negligible
44	15/00379/OUT	18.3	0.5	1	-	0.4	0.58	0.28	0.01	0.19	<0.005	20.3	51	Negligible
45	16/01475/SCR	29.9	1.3	3	-	-	0.32	0.26	0.01	0.24	<0.005	32.1	80	Slight
46	GR/17/674	22.4	0.2	1	-	1.1	0.09	0.08	<0.005	0.10	<0.005	24.1	60	Negligible
47	20141214	38.6	0.2	1	-	1.1	0.09	0.07	<0.005	0.10	<0.005	40.3	101	Slight

*For receptors R1 to R27, the AC includes the PC from Tilbury2. Receptors in bold exceed the AQAL.

2.2.2 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all but two receptors. At West Street (receptor 9) the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development. At receptor 47 (20141214), the AQS objective is exceeded with the cumulative developments. The PC from Thurrock Flexible Generation Plant at this receptor is only 1% of the AQS objective and the biggest contribution is from the Tilbury2 development.

2.2.3 When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse' for all receptors.

2.2.4 There are two receptors where the cumulative impact is 'moderate adverse': Walnut Tree Farm (receptor 7) and West Street (receptor 9).

2.2.5 With reference to the impacts at these receptors, the Environment Agency's on-line guidance (DEFRA and EA, 2016) states that:

"You don't need to take further action if your assessment has shown that both of the following apply:

Your proposed emissions comply with BAT associated emission levels (AELs) or the equivalent requirements where there is not BAT AEL

... the resulting PECs won't exceed environmental standards".

2.2.6 At Walnut Tree Farm (receptor 7), the PEC is below the AQAL.

2.2.7 At West Street, the cumulative impact descriptor is 'moderate adverse' and the cumulative PEC is 107% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 2.5: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

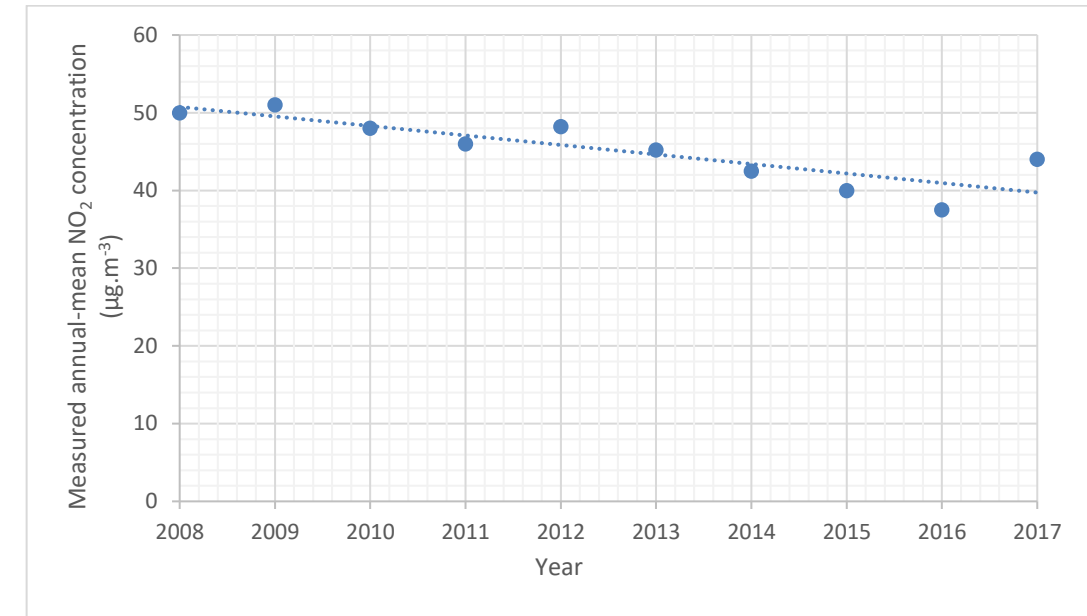


Figure 2.2: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

2.2.8 The results show that at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is likely to be a conservative assumption and, in reality, the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and the opening years of some of the other cumulative developments are likely to be even later so concentrations are expected to decrease even further.

2.2.9 If the AC at West Street is assumed to be 37.5 µg.m⁻³, the PEC is only 96% of the AQAL and based on the Environment Agency's on-line guidance (DEFRA and EA, 2016) further action would not be required.

2.2.10 As discussed in Volume 4, Chapter 25: Air Quality, other smaller cumulative developments will generate traffic which could increase concentrations of NO₂.

2.2.11 There are five receptors where the Cumulative PEC is greater than 90% of the AQAL; receptors 3, 9, 22, 38 and 47.

- 2.2.12 Section 2.5 of Volume 3, Chapter 12: Air Quality provides an analysis of the sources of uncertainty in the results of the assessment. The conclusion of that analysis was that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.
- 2.2.13 Similarly, a number of maximum design parameters were assessed. It should be noted that the results presented in this chapter are worst-case and based on a number of conservative assumptions. In reality, it is unlikely that all the maximum design parameters will be implemented.
- 2.2.14 In particular, SCR will be implemented and the Thurrock Flexible Generation Plant PCs are likely to more than halve.
- 2.2.15 On that basis and using professional judgement, the overall significance of the long-term cumulative effect is considered to be minor adverse.

Short-term Impacts

- 2.2.16 Table 2.3 summarises the short-term maximum PC and cumulative PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown. For the short-term Cumulative PEC, the Thurrock Flexible Generation Plant PC has been added to the Cumulative AC and the short-term PC for Tilbury Green Power, Tilbury Peak Reserve, Thames Enterprise Park, Gateway Energy Centre and Purfleet Regeneration Centre. The cumulative AC has been calculated by adding the short-term PCs of the above cumulative developments to the doubled AC, Tilbury 2 PC and Lower Thames Crossing PC. This follows the Environment Agency's on-line guidance (DEFRA and EA, 2016) which states that: *"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration."*

Table 2.6: Short-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 3.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)*	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative AC (µg.m ⁻³)	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	46.0	23	0.6	-	5.10	15.98	0.21	3.44	0.12	78.9	125.0	62	Moderate
2	Sandhurst Road	52.9	40.5	20	3.0	-	4.85	19.45	0.19	3.26	0.13	86.8	127.3	64	Slight
3	School	68.1	24.5	12	0.9	-	5.61	6.41	0.18	2.83	0.15	85.0	109.5	55	Slight
4	Gateway Academy	57.4	23.8	12	-	0.6	6.76	4.82	0.24	3.16	0.14	73.7	97.6	49	Slight
5	Gravel Pit Cottages	36.0	40.0	20	-	1.0	4.12	4.74	0.23	4.14	0.09	51.3	91.4	46	Slight
6	Princess Margaret Rd	36.0	28.2	14	-	-	3.16	4.09	0.22	4.37	0.08	47.9	76.2	38	Slight
7	Walnut Tree Farm	36.7	65.2	33	-	1.0	4.48	6.02	0.22	4.12	0.10	53.6	118.8	59	Moderate
8	The Green	36.7	42.4	21	-	-	5.35	5.82	0.23	3.94	0.12	52.1	94.5	47	Moderate
9	West Street	83.7	21.8	11	-	-	3.84	7.70	0.15	2.77	0.11	98.3	120.1	60	Slight
10	Milton School	61.7	21.3	11	-	-	3.43	6.11	0.14	2.83	0.10	74.3	95.6	48	Slight
11	Royal Pier Road	63.6	22.7	11	-	-	3.75	7.04	0.15	2.78	0.11	77.4	100.1	50	Slight
12	West Tilbury Hall	36.7	49.4	25	-	-	5.32	6.31	0.23	3.74	0.11	52.4	101.8	51	Moderate
13	Cooper Shore	36.7	66.3	33	-	-	4.73	6.86	0.23	3.73	0.10	52.3	118.6	59	Moderate
14	R1	62.2	8.9	4	0.1	-	2.93	1.82	0.17	2.69	0.43	70.2	79.2	40	Negligible
15	R2	55.2	8.2	4	0.0	-	2.08	1.48	0.20	2.62	0.38	62.0	70.2	35	Negligible
16	R3	56.6	15.4	8	0.4	-	2.74	2.16	0.24	3.49	0.20	65.4	80.8	40	Negligible
17	R4	53.8	13.2	7	0.5	-	3.22	3.48	0.27	4.40	0.16	65.3	78.5	39	Negligible
18	R5	64.4	13.2	7	0.3	-	3.03	3.34	0.27	4.25	0.16	75.5	88.7	44	Negligible
19	R6	53.8	15.1	8	0.1	2.1	3.23	3.50	0.28	4.64	0.14	69.8	84.9	42	Negligible
20	R7	56.2	16.0	8	0.8	0.9	3.87	4.23	0.27	4.68	0.15	71.2	87.2	44	Negligible
21	R8	57.8	17.4	9	0.8	0.1	8.81	4.50	0.22	2.89	0.13	74.5	91.9	46	Negligible
22	R9	73.2	21.4	11	1.9	-	7.01	5.04	0.19	3.04	0.16	88.6	110.1	55	Slight
23	R10	61.2	24.4	12	4.4	-	5.45	7.06	0.18	3.02	0.15	77.1	101.5	51	Slight
24	R11	53.2	27.6	14	1.7	-	4.85	9.31	0.18	3.03	0.14	70.7	98.3	49	Slight
25	R12	52.2	28.3	14	1.7	-	4.84	10.12	0.17	3.03	0.14	70.5	98.8	49	Slight

Receptor ID	Receptor Name	AC ($\mu\text{g.m}^{-3}$)*	PC ($\mu\text{g.m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g.m}^{-3}$)*	Lower Thames Crossing PC ($\mu\text{g.m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g.m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g.m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g.m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g.m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g.m}^{-3}$)	Cumulative AC ($\mu\text{g.m}^{-3}$)	PEC ($\mu\text{g.m}^{-3}$)	PEC as % of AQAL	Impact Descriptor
26	R13	52.8	39.0	19	3.0	-	4.93	19.32	0.19	3.23	0.13	80.6	119.6	60	Slight
27	R14	53.6	35.4	18	3.8	-	4.78	18.07	0.18	3.21	0.13	80.0	115.4	58	Slight
28	R15	47.2	45.7	23	0.6	-	5.03	19.13	0.20	3.39	0.12	75.1	120.8	60	Moderate
29	R16	51.6	31.4	16	1.8	-	5.16	13.99	0.18	3.13	0.14	74.2	105.6	53	Slight
30	R17	52.4	30.2	15	2.1	-	4.86	11.92	0.17	3.10	0.14	72.6	102.8	51	Slight
31	R18	48.2	16.5	8	0.2	-	2.85	2.34	0.25	3.74	0.18	57.6	74.0	37	Negligible
32	R19	63.2	24.8	12	0.9	-	5.62	6.00	0.18	2.78	0.15	77.9	102.7	51	Slight
33	R20	47.0	10.8	5	0.1	-	3.71	2.07	0.22	3.46	0.22	56.7	67.5	34	Negligible
34	R21	69.6	10.5	5	0.5	-	3.61	2.12	0.21	3.38	0.23	79.1	89.6	45	Negligible
35	R22	49.6	8.9	4	<0.05	-	2.70	1.68	0.17	2.63	0.58	57.4	66.3	33	Negligible
36	R23	68.2	8.3	4	0.1	-	1.98	1.34	0.17	2.35	0.58	74.6	83.0	41	Negligible
37	R24	57.0	10.6	5	0.1	-	1.86	1.17	0.20	2.58	0.29	63.1	73.7	37	Negligible
38	R25	67.6	11.7	6	0.1	2.0	2.38	2.43	0.39	5.54	0.11	82.5	94.2	47	Negligible
39	R26	45.2	11.2	6	<0.05	-	1.67	1.16	0.19	2.57	0.25	51.0	62.3	31	Negligible
40	R27	49.0	15.7	8	0.3	0.9	3.67	4.16	0.27	4.75	0.16	63.8	79.5	40	Negligible
41	16/01232/OUT	36.0	37.3	19	-	2.1	4.64	5.00	0.23	4.29	0.10	54.5	91.7	46	Slight
42	18/00664/CONDC	59.8	28.9	14	-	-	4.32	4.69	0.24	4.57	0.10	73.7	102.6	51	Slight
43	16/00412/OUT	36.7	28.4	14	-	0.4	5.87	5.45	0.26	3.43	0.13	52.6	81.0	41	Slight
44	15/00379/OUT	36.7	24.8	12	-	0.4	5.82	5.28	0.26	3.72	0.13	52.7	77.5	39	Slight
45	16/01475/SCR	59.8	24.9	12	-	-	4.05	4.08	0.29	4.87	0.11	73.2	98.1	49	Slight
46	GR/17/674	44.8	13.6	7	-	1.1	2.80	3.41	0.13	2.56	0.11	56.0	69.6	35	Negligible
47	20141214	77.3	12.5	6	-	1.1	2.75	3.33	0.13	2.58	0.11	88.4	100.8	50	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

2.2.17 For all receptors the cumulative PEC is less than 65% of the AQAL of 200 $\mu\text{g.m}^{-3}$. This demonstrates that there is considerable headroom between the short-term AQAL and the PEC. On that basis and using professional judgement, the short-term cumulative effect is considered to be minor adverse.

2.3 Scenario 4: 33 x 18.4 MW engines, aggregated stacks of 6 groups of five engines per stack and one group of three engines per stack (7 stacks)

Long-term Impacts

2.3.1 Table 2.7 summarises the long-term maximum Process Contribution (PC) and the Cumulative Predicted Environmental Concentrations (PEC) values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown.

Table 2.7: Long-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors –Scenario 4.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	Thurrock Flexible Generation Plant PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative PEC (µg.m ⁻³)	Cumulative PEC as % of AQAL	Impact Descriptor
1	Fort Road	26.4	1.7	4	0.6	-	0.27	1.23	0.01	0.15	<0.005	30.4	76	Slight
2	Sandhurst Road	26.4	1.2	3	3	-	0.26	1.23	0.01	0.14	<0.005	32.3	81	Slight
3	School	34.0	0.6	2	0.9	-	0.31	0.35	0.01	0.13	0.01	36.4	91	Slight
4	Gateway Academy	28.7	0.2	1	-	0.6	0.70	0.24	0.01	0.17	<0.005	30.6	77	Negligible
5	Gravel Pit Cottages	18.0	2.1	5	-	1.0	0.28	0.44	0.01	0.18	<0.005	22.0	55	Negligible
6	Princess Margaret Rd	18.0	1.1	3	-	-	0.21	0.32	0.01	0.19	<0.005	19.9	50	Negligible
7	Walnut Tree Farm	18.3	2.1	5	-	1.0	0.33	0.65	0.01	0.17	<0.005	22.6	56	Negligible
8	The Green	18.3	0.6	2	-	-	0.45	0.40	0.01	0.18	<0.005	20.0	50	Negligible
9	West Street	41.8	0.3	1	-	-	0.14	0.26	0.01	0.12	<0.005	42.7	107	Moderate
10	Milton School	30.9	0.2	1	-	-	0.12	0.18	0.01	0.12	<0.005	31.5	79	Negligible
11	Royal Pier Road	31.8	0.3	1	-	-	0.14	0.24	0.01	0.12	<0.005	32.6	82	Negligible
12	West Tilbury Hall	18.3	0.7	2	-	-	0.42	0.48	0.01	0.18	<0.005	20.1	50	Negligible
13	Cooper Shore	18.3	1.1	3	-	-	0.36	0.65	0.01	0.17	<0.005	20.7	52	Negligible
14	R1	31.1	0.1	0	0.1	-	0.09	0.04	0.01	0.17	0.06	31.5	79	Negligible
15	R2	27.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.17	0.04	28.0	70	Negligible
16	R3	28.3	0.1	0	0.4	-	0.14	0.06	0.01	0.23	0.01	28.9	72	Negligible
17	R4	26.9	0.2	0	0.5	-	0.31	0.13	0.01	0.27	0.01	27.8	69	Negligible
18	R5	32.2	0.2	0	0.3	-	0.29	0.13	0.01	0.28	0.01	33.1	83	Negligible
19	R6	26.9	0.2	1	0.1	2.1	0.36	0.11	0.01	0.31	0.01	30.0	75	Negligible
20	R7	28.1	0.2	0	0.8	0.9	0.53	0.17	0.01	0.25	0.01	30.1	75	Negligible
21	R8	28.9	0.2	1	0.8	0.1	1.06	0.14	0.01	0.15	0.01	30.6	76	Negligible
22	R9	36.6	0.5	1	1.9	-	0.41	0.21	0.01	0.14	0.01	37.9	95	Slight
23	R10	30.6	0.6	2	4.4	-	0.29	0.41	0.01	0.13	0.01	32.0	80	Slight
24	R11	26.6	0.5	1	1.7	-	0.24	0.79	0.01	0.13	<0.005	28.3	71	Negligible
25	R12	26.1	0.6	1	1.7	-	0.24	0.92	0.01	0.13	<0.005	28.0	70	Negligible

Receptor ID	Receptor Name	AC ($\mu\text{g}\cdot\text{m}^{-3}$)*	Thurrock Flexible Generation Plant PC ($\mu\text{g}\cdot\text{m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Lower Thames Crossing PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g}\cdot\text{m}^{-3}$)	Cumulative PEC ($\mu\text{g}\cdot\text{m}^{-3}$)	Cumulative PEC as % of AQAL	Impact Descriptor
26	R13	26.4	1.1	3	3.0	-	0.26	1.14	0.01	0.14	<0.005	29.0	73	Negligible
27	R14	26.8	0.9	2	3.8	-	0.26	1.14	0.01	0.14	<0.005	29.2	73	Negligible
28	R15	23.6	1.6	4	0.6	-	0.25	1.50	0.01	0.14	<0.005	27.1	68	Negligible
29	R16	25.8	0.7	2	1.8	-	0.25	1.24	0.01	0.13	<0.005	28.1	70	Negligible
30	R17	26.2	0.6	2	2.1	-	0.24	1.18	0.01	0.13	<0.005	28.4	71	Negligible
31	R18	24.1	0.1	0	0.2	-	0.16	0.08	0.01	0.24	0.01	24.7	62	Negligible
32	R19	31.6	0.7	2	0.9	-	0.32	0.34	0.01	0.13	0.01	33.1	83	Slight
33	R20	23.5	0.1	0	0.1	-	0.14	0.05	0.01	0.22	0.02	24.0	60	Negligible
34	R21	34.8	0.1	0	0.5	-	0.12	0.05	0.01	0.20	0.02	35.3	88	Negligible
35	R22	24.8	0.1	0	<0.05	-	0.08	0.04	0.01	0.16	0.08	25.2	63	Negligible
36	R23	34.1	0.1	0	0.1	-	0.07	0.03	0.01	0.15	0.04	34.5	86	Negligible
37	R24	28.5	0.1	0	0.1	-	0.08	0.03	0.01	0.12	0.02	28.8	72	Negligible
38	R25	33.8	0.2	1	0.1	2.0	0.23	0.09	0.02	0.34	0.01	36.7	92	Negligible
39	R26	22.6	0.1	0	<0.05	-	0.07	0.03	0.01	0.11	0.01	22.9	57	Negligible
40	R27	24.5	0.2	0	0.3	0.9	0.52	0.17	0.01	0.25	0.01	26.5	66	Negligible
41	16/01232/OUT	18.0	1.8	4	-	2.1	0.34	0.44	0.01	0.19	<0.005	22.9	57	Negligible
42	18/00664/CONDC	29.9	1.2	3	-	-	0.31	0.31	0.01	0.20	<0.005	32.0	80	Slight
43	16/00412/OUT	18.3	0.3	1	-	0.4	0.56	0.31	0.01	0.18	<0.005	20.0	50	Negligible
44	15/00379/OUT	18.3	0.2	1	-	0.4	0.58	0.28	0.01	0.19	<0.005	20.0	50	Negligible
45	16/01475/SCR	29.9	0.8	2	-	-	0.32	0.26	0.01	0.24	<0.005	31.5	79	Slight
46	GR/17/674	22.4	0.2	0	-	1.1	0.09	0.08	<0.005	0.10	<0.005	24.0	60	Negligible
47	20141214	38.6	0.2	0	-	1.1	0.09	0.07	<0.005	0.10	<0.005	40.2	100	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2. Receptors in bold exceed the AQAL.

- 2.3.2 Predicted annual-mean NO₂ at the facades of existing receptors are below the AQS objective for NO₂ for all but one receptor. At West Street (receptor 9) the predicted NO₂ concentration exceeds the AQS objective of 40 µg.m⁻³ both with and without the development.
- 2.3.3 When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor ranges from 'negligible' to 'moderate adverse' for all receptors.
- 2.3.4 There is one receptor where the cumulative impact is 'moderate adverse': West Street (receptor 9).
- 2.3.5 At West Street, the cumulative impact descriptor is 'moderate adverse' and the cumulative PEC is 107% of the AQAL. This is in large part due to the AC which itself exceeds the AQAL. The AC is based on the average measured concentrations between 2013 and 2017 at the nearest monitoring location, GR13. The table and graph below shows the measured concentrations at GR13 in the last ten years.

Table 2.8: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GR13	50	51	48	46	48.2	45.2	42.5	40	37.5	44

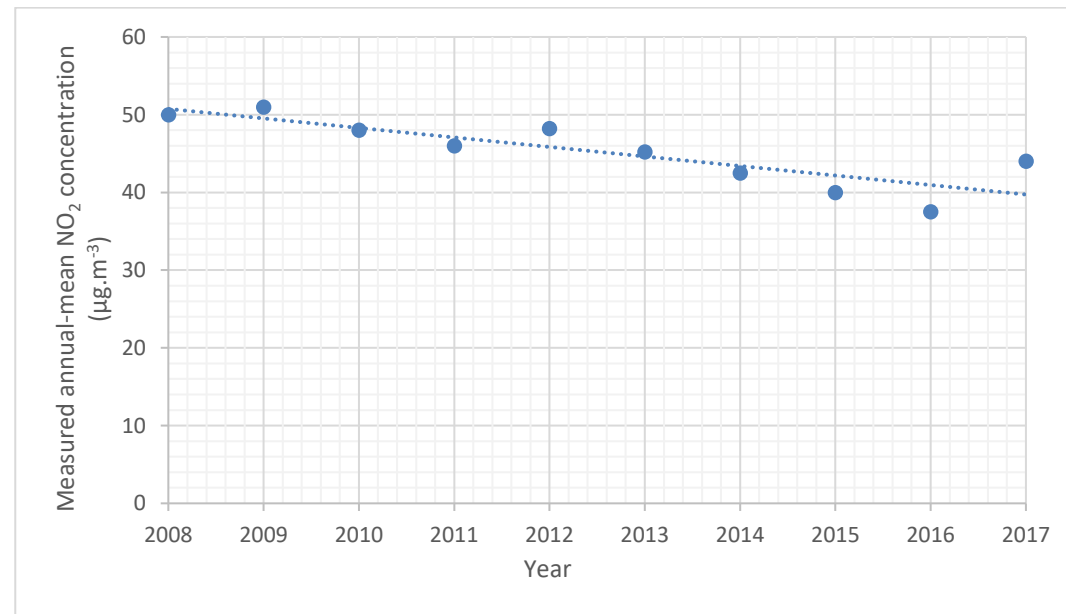


Figure 2.3: Annual-mean NO₂ Concentrations at GR13 (µg.m⁻³).

- 2.3.6 The results show that at this location, measured concentrations have decreased. Therefore, an AC of 41.8 µg.m⁻³ is likely to be a conservative assumption and, in reality, the AC in the opening year is likely to be lower. This is in line with the view that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. The opening year of the proposed development is likely to be 2022 at the earliest and the opening years of some of the other cumulative developments are likely to be even later so concentrations are expected to decrease even further.
- 2.3.7 If the AC at West Street is assumed to be 37.5 µg.m⁻³, the PEC is only 96% of the AQAL and based on the Environment Agency's on-line guidance (DEFRA and EA, 2016) further action would not be required.
- 2.3.8 As discussed in Volume 4, Chapter 25: Air Quality, other smaller cumulative developments will generate traffic which could increase concentrations of NO₂.
- 2.3.9 There are five receptors where the Cumulative PEC is greater than 90% of the AQAL; receptors 3, 9, 22, 38 and 47.
- 2.3.10 Section 2.5 of Volume 3, Chapter 12: Air Quality provides an analysis of the sources of uncertainty in the results of the assessment. The conclusion of that analysis was that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.
- 2.3.11 Similarly, a number of maximum design parameters were assessed. It should be noted that the results presented in this chapter are worst-case and based on a number of conservative assumptions. In reality, it is unlikely that all the maximum design parameters will be implemented.
- 2.3.12 In particular, SCR will be implemented and the Thurrock Flexible Generation Plant PCs are likely to more than halve.
- 2.3.13 On that basis and using professional judgement, the overall significance of the long-term cumulative effect is considered to be minor adverse.

Short-term Impacts

- 2.3.14 Table 2.3 summarises the short-term maximum PC and cumulative PEC values at the selected discrete sensitive receptors. The EPUK & IAQM impact descriptors are also shown. For the short-term Cumulative PEC, the Thurrock Flexible Generation Plant PC has been added to the Cumulative AC and the short-term PC for Tilbury Green Power, Tilbury Peak Reserve, Thames Enterprise Park, Gateway Energy Centre and Purfleet Regeneration Centre. The cumulative AC has been calculated by adding the short-term PCs of the above cumulative developments to the doubled AC, Tilbury 2 PC and Lower Thames Crossing PC. This follows the Environment Agency's on-line guidance (DEFRA and EA, 2016) which states that: *"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration."*

Table 2.9: Short-term Cumulative Predicted NO₂ Concentrations (µg.m⁻³) at Sensitive Receptors – Scenario 4.

Receptor ID	Receptor Name	AC (µg.m ⁻³)*	PC (µg.m ⁻³)	PC as % of AQAL	Tilbury2 PC (µg.m ⁻³)*	Lower Thames Crossing PC (µg.m ⁻³)	Tilbury Green Power PC (µg.m ⁻³)	Tilbury Peak Reserve PC (µg.m ⁻³)	Thames Enterprise Park PC (µg.m ⁻³)	Gateway Energy Centre PC (µg.m ⁻³)	Purfleet Centre Regeneration PC (µg.m ⁻³)	Cumulative AC (µg.m ⁻³)	PEC (µg.m ⁻³)	PEC as % of AQAL	Impact Descriptor
1	Fort Road	52.9	26.8	13	0.6	-	5.10	15.98	0.21	3.44	0.12	78.9	105.7	53	Slight
2	Sandhurst Road	52.9	22.5	11	3.0	-	4.85	19.45	0.19	3.26	0.13	86.8	109.3	55	Slight
3	School	68.1	12.7	6	0.9	-	5.61	6.41	0.18	2.83	0.15	85.0	97.7	49	Negligible
4	Gateway Academy	57.4	11.6	6	-	0.6	6.76	4.82	0.24	3.16	0.14	73.7	85.3	43	Negligible
5	Gravel Pit Cottages	36.0	22.6	11	-	1.0	4.12	4.74	0.23	4.14	0.09	51.3	73.9	37	Slight
6	Princess Margaret Rd	36.0	14.1	7	-	-	3.16	4.09	0.22	4.37	0.08	47.9	62.0	31	Negligible
7	Walnut Tree Farm	36.7	37.2	19	-	1.0	4.48	6.02	0.22	4.12	0.10	53.6	90.8	45	Slight
8	The Green	36.7	23.2	12	-	-	5.35	5.82	0.23	3.94	0.12	52.1	75.3	38	Slight
9	West Street	83.7	11.5	6	-	-	3.84	7.70	0.15	2.77	0.11	98.3	109.8	55	Negligible
10	Milton School	61.7	11.4	6	-	-	3.43	6.11	0.14	2.83	0.10	74.3	85.8	43	Negligible
11	Royal Pier Road	63.6	11.8	6	-	-	3.75	7.04	0.15	2.78	0.11	77.4	89.3	45	Negligible
12	West Tilbury Hall	36.7	27.8	14	-	-	5.32	6.31	0.23	3.74	0.11	52.4	80.1	40	Slight
13	Cooper Shore	36.7	38.4	19	-	-	4.73	6.86	0.23	3.73	0.10	52.3	90.7	45	Slight
14	R1	62.2	4.0	2	0.1	-	2.93	1.82	0.17	2.69	0.43	70.2	74.2	37	Negligible
15	R2	55.2	4.1	2	0.0	-	2.08	1.48	0.20	2.62	0.38	62.0	66.0	33	Negligible
16	R3	56.6	6.0	3	0.4	-	2.74	2.16	0.24	3.49	0.20	65.4	71.5	36	Negligible
17	R4	53.8	7.6	4	0.5	-	3.22	3.48	0.27	4.40	0.16	65.3	72.9	36	Negligible
18	R5	64.4	6.9	3	0.3	-	3.03	3.34	0.27	4.25	0.16	75.5	82.4	41	Negligible
19	R6	53.8	8.8	4	0.1	2.1	3.23	3.50	0.28	4.64	0.14	69.8	78.6	39	Negligible
20	R7	56.2	8.3	4	0.8	0.9	3.87	4.23	0.27	4.68	0.15	71.2	79.6	40	Negligible
21	R8	57.8	9.7	5	0.8	0.1	8.81	4.50	0.22	2.89	0.13	74.5	84.3	42	Negligible
22	R9	73.2	11.9	6	1.9	-	7.01	5.04	0.19	3.04	0.16	88.6	100.5	50	Negligible
23	R10	61.2	12.9	6	4.4	-	5.45	7.06	0.18	3.02	0.15	77.1	90.0	45	Negligible
24	R11	53.2	13.1	7	1.7	-	4.85	9.31	0.18	3.03	0.14	70.7	83.9	42	Negligible
25	R12	52.2	13.4	7	1.7	-	4.84	10.12	0.17	3.03	0.14	70.5	83.9	42	Negligible

Receptor ID	Receptor Name	AC ($\mu\text{g.m}^{-3}$)*	PC ($\mu\text{g.m}^{-3}$)	PC as % of AQAL	Tilbury2 PC ($\mu\text{g.m}^{-3}$)*	Lower Thames Crossing PC ($\mu\text{g.m}^{-3}$)	Tilbury Green Power PC ($\mu\text{g.m}^{-3}$)	Tilbury Peak Reserve PC ($\mu\text{g.m}^{-3}$)	Thames Enterprise Park PC ($\mu\text{g.m}^{-3}$)	Gateway Energy Centre PC ($\mu\text{g.m}^{-3}$)	Purfleet Centre Regeneration PC ($\mu\text{g.m}^{-3}$)	Cumulative AC ($\mu\text{g.m}^{-3}$)	PEC ($\mu\text{g.m}^{-3}$)	PEC as % of AQAL	Impact Descriptor
26	R13	52.8	21.4	11	3.0	-	4.93	19.32	0.19	3.23	0.13	80.6	102.0	51	Slight
27	R14	53.6	18.9	9	3.8	-	4.78	18.07	0.18	3.21	0.13	80.0	98.8	49	Negligible
28	R15	47.2	26.1	13	0.6	-	5.03	19.13	0.20	3.39	0.12	75.1	101.2	51	Slight
29	R16	51.6	15.0	8	1.8	-	5.16	13.99	0.18	3.13	0.14	74.2	89.2	45	Negligible
30	R17	52.4	14.0	7	2.1	-	4.86	11.92	0.17	3.10	0.14	72.6	86.6	43	Negligible
31	R18	48.2	6.5	3	0.2	-	2.85	2.34	0.25	3.74	0.18	57.6	64.1	32	Negligible
32	R19	63.2	12.6	6	0.9	-	5.62	6.00	0.18	2.78	0.15	77.9	90.6	45	Negligible
33	R20	47.0	5.7	3	0.1	-	3.71	2.07	0.22	3.46	0.22	56.7	62.4	31	Negligible
34	R21	69.6	5.5	3	0.5	-	3.61	2.12	0.21	3.38	0.23	79.1	84.6	42	Negligible
35	R22	49.6	3.8	2	<0.05	-	2.70	1.68	0.17	2.63	0.58	57.4	61.2	31	Negligible
36	R23	68.2	3.6	2	0.1	-	1.98	1.34	0.17	2.35	0.58	74.6	78.3	39	Negligible
37	R24	57.0	4.8	2	0.1	-	1.86	1.17	0.20	2.58	0.29	63.1	67.9	34	Negligible
38	R25	67.6	6.9	3	0.1	2.0	2.38	2.43	0.39	5.54	0.11	82.5	89.3	45	Negligible
39	R26	45.2	4.9	2	<0.05	-	1.67	1.16	0.19	2.57	0.25	51.0	55.9	28	Negligible
40	R27	49.0	8.5	4	0.3	0.9	3.67	4.16	0.27	4.75	0.16	63.8	72.3	36	Negligible
41	16/01232/OUT	36.0	19.7	10	-	2.1	4.64	5.00	0.23	4.29	0.10	54.5	74.2	37	Negligible
42	18/00664/CON DC	59.8	14.0	7	-	-	4.32	4.69	0.24	4.57	0.10	73.7	87.7	44	Negligible
43	16/00412/OUT	36.7	13.2	7	-	0.4	5.87	5.45	0.26	3.43	0.13	52.6	65.8	33	Negligible
44	15/00379/OUT	36.7	11.7	6	-	0.4	5.82	5.28	0.26	3.72	0.13	52.7	64.4	32	Negligible
45	16/01475/SCR	59.8	12.3	6	-	-	4.05	4.08	0.29	4.87	0.11	73.2	85.5	43	Negligible
46	GR/17/674	44.8	7.3	4	-	1.1	2.80	3.41	0.13	2.56	0.11	56.0	63.4	32	Negligible
47	20141214	77.3	7.6	4	-	1.1	2.75	3.33	0.13	2.58	0.11	88.4	96.0	48	Negligible

*For receptors R1 to R27, the AC includes the PC from Tilbury2.

2.3.15 For all receptors the cumulative PEC is less than 55% of the AQAL of $200 \mu\text{g.m}^{-3}$. This demonstrates that there is considerable headroom between the short-term AQAL and the PEC. On that basis and using professional judgement, the short-term cumulative effect is considered to be minor adverse.

3. References

Department for Environment, Food & Rural Affairs (DEFRA) and Environment Agency (EA) (2016) Air emissions risk assessment for your environmental permit. [Online]. Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Accessed 07 October 2019]

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