TECHNICAL NOTE

Job Name: Riverside Optimisation Project (ROP)

Date: April 2021

Prepared By: Stantec

Subject: **RRRF Environmental Permit Variation – Air Emission Risk Assessment**

1. Introduction

1.1. The Riverside Resource Recovery Facility ('RRRF') operated by Riverside Resource Recovery Limited (part of Cory Riverside Energy group (Cory)) is an Energy Recovery Facility ('ERF') situated at Norman Road in Belvedere within the London Borough of Bexley.

1.2. Operating since 2011, RRRF has recently been fitted internally with an upgraded operational control system that enables a more consistent level of operation. This technology enables RRRF to be operated more efficiently than its original design when first built.

1.3. In order to realise this increased efficiency in operations, the terms of the relevant permissions that RRRF currently operates under need to be amended.

1.4. Consequently, Riverside Resource Recovery Limited is therefore submitting to the Secretary of State for the Department of Business, Energy and Industrial Strategy ('BEIS') an application ('the Application') under section 36C of the Electricity Act 1989 to:

- amend the power generation description of RRRF in the 2015 s.36 Variation (application reference GDBC/003/00001C-06) to change the energy generation limit from 'up to 72MW' to 'up to '80.5MW';
- request that the Secretary of State then gives a direction under section 90(2) of the Town and Country Planning Act 1990 ('TCPA 1990') varying the conditions attached to the 2017 Permission (application reference 16/02167/FUL), to increase the maximum waste throughput from 785,000 tonnes per annum (tpa) to 850,000 tpa; and
- amend the s.36 Variation and to incorporate into the new deemed planning permission the amendments authorised by the Secretary of State in the Riverside Energy Park ('REP') Development Consent Order ('DCO') regarding the ash storage area for RRRF and use of the jetty by both RRRF and REP.

1.5. This is called the Riverside Optimisation Project ('ROP') and the changes outlined above are referred to as the 'Proposed Changes'. ROP will not alter the physical built footprint or give rise to additional physical development of RRRF. Although ROP would result in an increase (of up to 65,000 tonnes) in the volume of waste throughput processed annually at the RRRF and would increase the facility's MW output, operations would follow the same procedures and remain fundamentally unchanged.

1.6. Whilst ROP does not involve any physical development, the proposed increase to the generating capacity and the increase in volume of waste throughput provide a change to or extension of a generating station, and as such ROP is considered to fall within Schedule 2, Part 3(a) of the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (as amended) ('the EIA Regulations'). ROP is consequently considered to be EIA development and an EIA Report has been prepared and submitted as part of the application to BEIS.

1.7. An air quality assessment has been prepared by Stantec UK Limited (Stantec) as part of the EIA Report to support the Section 36 Variation. Chapter 5 of the EIA Report presents the findings of the assessment of the likely significant effects from the Proposed Changes as a result of ROP at the RRRF Energy Recovery Facility (ERF) with respect to air quality. The purpose of the EIA Report chapter was to describe and evaluate the likely air quality impacts and classify the effects of the Proposed Changes in accordance with the EIA regulations. Chapter 5 of the EIA Report concluded that the residual air quality effects of the Proposed Changes are considered to be 'not significant' in EIA terms.

Purpose of this Technical Note

1.8. Riverside Resource Recovery Limited is applying to the Environment Agency (EA) under the Environmental Permitting Regulations for a variation to the Environmental Permit (EP) for RRRF to operate the RRRF (permit reference BK0825UI) with the Proposed Changes in place (referred to herein as 'RRRF post-ROP').

1.9. This technical note outlines the results of the air emission risk assessment that has been undertaken utilising atmospheric dispersion modelling techniques to support the EP application for the RRRF post-ROP. This assessment draws on the modelling work undertaken for the EIA Report but the results have been interpreted in accordance with the requirements of the Environment Agency (EA) to identify if the impacts represent 'significant pollution' as required to determine an EP application. This note is to be read in conjunction with the EIA Report. A detailed description of the modelling methodology is presented in Chapter 5 and appendices of the EIA Report.

2. Relevant Legislation and Guidance

Legislation

2.1. Chapter 5 of the EIA Report provides a detailed review of legislation, including the Environmental Permitting Regulations. The Environmental Permitting Regulations require that the design and operation of all thermal treatment plants must ensure compliance with Emission Limit Values (ELVs) as defined by the Environmental Permitting Regulations and subsequent 'Best Available Technique' (BAT) conclusions to ensure that 'significant pollution' is not caused.

2.2. The most recent BAT conclusions are documented in the Waste Incineration Best Available Techniques Reference Document (BREF)[1] which identifies Best Available Techniques Associated Emission Levels (BAT-AELs) which for some pollutants differ from those within the EP Regulations and current RRRF Permit. The EA have indicated that these BAT-AELs will be applied for new plant and adoption of these BAT-AELs will be required for existing plant from November 2023 (unless a derogation is granted). As a result of the Proposed Changes, the Applicant is proposing to comply with these BREF BAT-AELs in advance of the EA's implementation date.

2.3. The applied Emission Limit Values (ELVs) applicable to waste incineration processes are presented in Table 5-2, Chapter 5 of the EIA Report.

Guidance

2.4. The EA's Air Emissions Risk Assessment (AERA) Guidance for Environmental Permitting[2] provides guidance on determining the impacts of emissions to air and the standards that are required to be met. The AERA guidance provides information on Environmental Assessment Levels (EALs) against which the impacts of emissions to air can be assessed to determine whether the impacts represent 'significant pollution'. The relevant EALs for pollutants likely to be emitted for both human health and terrestrial biodiversity receptors are presented in Table 5-3, Chapter 5 of the EIA Report.

---

[1] European Union (2019). Waste Incineration Best Available Techniques Reference European IPPC Bureau (EIPPCB)
[2] EA (2020). Air Emissions Risk Assessment for your Environmental Permit. October 2020.

3. Identification of Sensitive Receptors / Summary of Baseline

Human Receptors

3.1. The general approach to this assessment is to assess the highest predicted process contribution (PC) to ground level concentrations, known as the point of maximum impact. In addition, the predicted PC at a number of sensitive receptor locations has also been assessed. These sensitive receptor locations are consistent with those assessed in the EIA Report for the Section 36 Variation, and are presented in Table 5-17, Chapter 5 of the EIA Report and their locations are shown in Figure 5-2 of the EIA Report.

Terrestrial Biodiversity Receptors

3.2. The AERA Guidance requires consideration of sites of ecological importance in accordance with the following criteria:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs), or Ramsar sites within 10 km (or 15km for 'large emitters') of a facility;
- Sites of Special Scientific Interest (SSSIs) within 10 km (or 15km for 'large emitters') of a facility; and
- National Nature Reserves (NNR), Local Nature Reserves (LNRs), Local Wildlife Sites (LWSs) and ancient woodlands within 2 km of a facility.

3.3. Terrestrial biodiversity receptors have been identified within 10km of the facility for nationally and internationally protected sites and 2km for locally protected sites and are detailed in Table 5-18, Chapter 5 of the EIA Report and their locations are shown in Figures 5.3 and 5.4 of the EIA Report.

Baseline Air Quality Summary

3.4. A detailed review of relevant baseline concentrations (from monitoring and modelling networks) has been undertaken as part of the Section 36 application. This is contained in Section 5.5, Chapter 5 of the EIA Report.

3.5. The entire London Borough of Bexley, as well as the neighbouring local authorities (London Borough of Barking and Dagenham, London Borough of Havering and Royal Borough of Greenwich) have been declared as Air Quality Management Areas due to exceedances of the annual mean NO_2, and 24-hour mean PM_{10} National Air Quality Strategy (AQS) objectives. In addition, the London Borough of Barking and Dagenham and London Borough of Bexley AQMAs have also been declared due to exceedances of the annual mean PM_{10} AQS objective.

3.6. Monitoring of NO_2 and PM_{10} concentrations at nearby automatic monitoring sites in the London Borough of Bexley indicate that there have been no exceedances of the AQS objectives between 2015 – 2019. In addition, measured $PM_{2.5}$ concentrations have been below the relevant EU limit value between 2015 – 2019.

3.7. The baseline concentrations selected for use in this assessment are consistent with those used in the EIA Report for the Section 36 Variation and are presented in Table 5-16, Chapter 5 of the EIA Report.

4. Methodology

4.1. Atmospheric dispersion modelling (using the ADMS-5 model) has been undertaken to determine the PC of all pollutants (and averaging periods) at the point of maximum impact and sensitive receptor locations. Dispersion modelling is considered to be a robust approach which takes into account the effect of buildings and meteorological conditions on the dispersion of pollutants in the atmosphere.

4.2. The impacts of the RRRF post-ROP operating in isolation, as well as the impacts of the RRRF post-ROP operating in combination with Riverside Energy Park (REP) have been assessed.

Atmospheric Dispersion Modelling

4.3. The model inputs including pollutant emission rates and model domain parameters are detailed in Section 5.4, Chapter 5 of the EIA Report.

4.4. In addition, Section 5.4, Chapter 5 of the EIA Report describes the methods used to process the model results. Results processing has been carried out in accordance with the EA AERA guidance.

Assessment Criteria

<u>Human Receptors</u>

4.5. In accordance with the EA's AERA guidance, a PC for any substance can be considered 'insignificant' if the PC meets the following criteria:

- the short-term PC is less than 10% if the short-term; and
- the long-term PC is less than 1% of the long-term environmental standard.

4.6. Initially, the maximum predicted PC has been assessed against these criteria. If the above criteria are achieved at the point of maximum impact, then it can be concluded that impacts are 'insignificant' at all locations and that no further assessment is required.

4.7. If these criteria are exceeded, the predicted environmental concentration (PEC - defined as the PC plus the background concentration) is then calculated and consideration given to predicted impacts at discrete receptor locations.

4.8. Further action is not required, and impacts are considered to be acceptable and not to constitute 'significant pollution' if both of the following criteria are met:

- the proposed emissions comply with BAT-AELs or the equivalent where there is no BAT AEL; and
- the resulting PECs will not exceed environmental standards.

<u>Ecological Receptors</u>

4.9. In addition to the AERA guidance, the EA's Operational Instruction 66_12[3] details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have '*no likely significant effects (alone and in-combination)*' for European sites, *'no likely damage'* for SSSI's and *'no significant pollution'* for other sites, as follows:

- PC <1% long-term critical level (Cle) and/or critical load (CLo) or that the PEC <70% long-term CLe and/or CLo for European sites and SSSIs;
- PC <10% short-term C_{Le} for NOx and HF (if applicable) for European sites and SSSIs;
- PC <100% long-term C_{Le} and/or C_{Lo} other conservation sites; and
- PC <100% short-term C_{Le} for NOx and HF (if applicable) for other conservation sites.

[3] EA Working Instruction 66_12 - Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

4.10. Where impacts cannot be classified as resulting in 'no likely significant effect', more detailed assessment may be required depending on the sensitivity of the feature in accordance with EAs Operational Instruction 67_12[4]. This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

4.11. The guidance provides the following further criteria:

- if the PEC<100% of the appropriate C_{Le} and/or C_{Lo} it can be assumed there will be no adverse effect;
- if the background is below the C_{Le} and/or C_{Lo}, but a small PC leads to an exceedance – decision based on local considerations;
- if the background is currently above the C_{Le} and/or C_{Lo} and the additional PC will cause a small increase – decision based on local considerations;
- if the background is below the C_{Le} and/or C_{Lo}, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- if the background is currently above the C_{Le} and/or C_{Lo} and the additional PC is large - cannot conclude no adverse effect.

5. Impacts on Human Receptors

5.1. **Table 5-1** and **Table 5-2** present the long-term and short-term results at the point of maximum impact.

5.2. The long-term PC at the point of maximum impact from the RRRF post-ROP are classified as 'insignificant' (i.e. PC is <1% of the EAL) for all pollutants except the following:

- annual mean NO_2 impacts;
- annual mean total organic carbon (TOC) (as 1,3-butadiene) impacts;
- annual mean cadmium (Cd) impacts;
- annual mean arsenic (As) impacts;
- annual mean nickel (Ni) impacts; and
- annual mean polycyclic aromatic hydrocarbon (PAH) (as benzo(a)pyrene) impacts.

5.3. The long-term PC at the point of maximum impact from RRRF post-ROP in combination with REP can also be classified as 'insignificant' for all pollutants (i.e. PC is <1% of EAL) except those listed above and additionally annual mean chromium VI (CrVI).

5.4. The short-term PC at the point of maximum impact from the RRRF post-ROP, alone and in combination with REP do not exceed 10% of the relevant EALs and therefore can be classified as 'insignificant' for all pollutants.

5.5. The detailed results tables for modelled impacts at discrete receptor locations are provided in Table B.2.1 – Table B.2.9, Appendix B.2 of the EIA Report. Further discussion of the results at modelled receptor locations is provided in the following sections.

Annual mean PM_{10}

[4] EA Working Instruction 67_12 - Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation.

5.6. Table B.2.1, Appendix B.2 of the EIA Report shows that the predicted annual mean PM_{10} PC from the RRRF post-ROP does not exceed 0.1% of the EAL at discrete receptor locations and does not exceed 1% of the EAL at any location.

5.7. The predicted annual mean PM_{10} PC of the RRRF post-ROP in combination with REP does not exceed 0.2% of the EAL at discrete receptor locations and does not exceed 1% of the EAL at any location.

5.8. Therefore, the predicted annual mean PM_{10} impacts of RRRF post-ROP alone and in combination with REP are considered to be ‘insignificant’. Furthermore, the predicted annual mean PM_{10} PCs from RRRF post-ROP are lower than those associated with the currently permitted RRRF.

Annual mean $PM_{2.5}$

5.9. Table B.2.2, Appendix B.2 of the EIA Report shows that the predicted annual mean $PM_{2.5}$ PC from the RRRF post-ROP does not exceed 0.2% of the EAL at any discrete receptor location and does not exceed 1% of the EAL at any location.

5.10. The predicted annual mean $PM_{2.5}$ PC of the RRRF post-ROP in combination with REP does not exceed 0.3% of the EAL at any discrete receptor location and does not exceed 1% of the EAL at any location.

5.11. Therefore, the predicted annual mean $PM_{2.5}$ impacts of RRRF post-ROP alone and in combination with REP are considered to be ‘insignificant’. Furthermore, the predicted annual mean $PM_{2.5}$ PCs from RRRF post-ROP are lower than those associated with the currently permitted RRRF.

Annual mean NO_2

5.12. Table B.2.3, Appendix B.2 of the EIA Report shows that the predicted annual mean NO_2 PC from the RRRF post-ROP only exceeds 1% of the EAL at R20, R20A, R21, R22 and R23 but does not exceed 2% of the EAL.

5.13. The PEC exceeds 70% of the EAL at all locations as the applied baseline concentration equals 70% of the EAL, however the PEC does not exceed 75% of the EAL at any location.

5.14. The predicted annual mean NO_2 PC from the RRRF post-ROP in combination with REP exceeds 1% of the EAL at twelve receptor locations and the maximum PEC is 75.5% of the EAL.

5.15. Therefore, the predicted annual mean NO_2 impacts of the RRRF post-ROP alone and in-combination with REP do not constitute ‘significant pollution’. Furthermore, the predicted annual mean NO_2 PCs from RRRF post-ROP are lower than those associated with the currently permitted RRRF.

Annual mean TOC

5.16. Table B.2.4, Appendix B.2 of the EIA Report shows that the predicted annual mean TOC PC from the RRRF post-ROP exceeds 1% of the applied EAL (for 1,3-butadiene) at eleven of the modelled receptors but the PEC does not exceed 15% of the EAL at any location.

5.17. The predicted annual mean TOC PC from the RRRF post-ROP in combination with REP exceeds 1% at 23 of the modelled receptor locations but the PEC does not exceed 20% of the EAL at any location.

5.18. Therefore, the predicted annual mean TOC impacts of the RRRF post-ROP alone and in-combination with REP do not constitute ‘significant pollution’.

Annual mean cadmium (Cd)

5.19. Table B.2.5, Appendix B.2 of the EIA Report shows that the predicted annual mean Cd PC from the RRRF post-ROP exceeds 1% of the EAL at nine of the modelled receptors but the PEC does not exceed 15% of the EAL at any location.

5.20. The predicted annual mean Cd PC from the RRRF post-ROP in combination with REP exceeds 1% of the EAL at 23 of the modelled receptor locations but the PEC does not exceed 20% of the EAL at any location.

5.21. Therefore, the predicted annual mean Cd impacts of the RRRF post-ROP alone and in-combination with REP do not constitute 'significant pollution'. Furthermore, the predicted annual mean Cd PCs from RRRF post-ROP are lower than those associated with the currently permitted RRRF.

Annual mean arsenic (As)

5.22. Table B.2.6, Appendix B.2 of the EIA Report shows that the predicted annual mean As PC from the RRRF post-ROP exceeds 1% of the EAL at 23 of the modelled receptors but the PEC does not exceed 50% of the EAL at any location.

5.23. The predicted annual mean As PC from the RRRF post-ROP in-combination with REP exceeds 1% at 28 of the modelled receptor locations but the PEC only marginally exceeds 50% (50.3%) of the EAL at the point of maximum impact.

5.24. Therefore, the predicted annual mean As impacts of the RRRF post-ROP alone and in-combination with REP do not constitute 'significant pollution'.

Annual mean hexavalent chromium (CrVI)

5.25. Table B.2.7, Appendix B.2 of the EIA Report shows that the predicted annual mean CrVI PC from the RRRF post-ROP does not exceed 1% of the EAL at any location.

5.26. The predicted annual mean CrVI PC of the RRRF post-ROP in combination with REP ranges does not exceed 1% of the EAL at any of the modelled receptors.

5.27. Whilst the CrVI PEC exceeds the EAL at all locations, this is due to the applied baseline concentration which is more than twice the EAL. However, the reliability of the applied baseline concentration is considered to be low as the monitoring of ambient CrVI concentration is extremely limited; in reality widespread exceedance of the EAL is not considered likely.

5.28. Therefore, the predicted annual mean CrVI impacts of the RRRF post-ROP alone and in-combination with REP do not constitute 'significant pollution'.

Annual mean nickel (Ni)

5.29. Table B.2.8, Appendix B.2 of the EIA Report shows that the predicted annual mean Ni PC from the RRRF post-ROP exceeds 1% of the EAL at 24 of the modelled receptors but the PEC does not exceed 25% of the EAL at any location.

5.30. The predicted annual mean Ni PC from the RRRF post-ROP in combination with REP exceeds 1% at 29 of the modelled receptor locations but the PEC does not exceed 35% of the EAL at any location.

5.31. Therefore, the predicted annual mean Ni impacts of the RRRF post-ROP alone and in-combination with REP do not constitute 'significant pollution'.

5.32. **Annual mean polyaromatic hydrocarbons (PAH)**

5.33. Table B.2.9, Appendix B.2 of the EIA Report shows that the predicted annual mean PAH PC from the RRRF post-ROP does not exceed 1% of the applied EAL for benzo-a-pyrene at any of the modelled receptors and the PEC does not exceed 70% of the applied EAL at any location.

5.34. The predicted annual mean PAH PC of the RRRF post-ROP in combination with REP does not exceed 1% of the applied EAL for benzo-a-pyrene at any of the modelled receptors and the PEC does not exceed 70% of the applied EAL at any location.

5.35. Therefore, the predicted annual mean PAH impacts of the RRRF post-ROP alone and in-combination with REP do not constitute 'significant pollution'.

6. Impacts on Ecological Receptors

6.1. As shown in Table B.3.1 to Table B.3.8, Appendix B.3 of the EIA Report, at all national and international protected statutory designated sites the predicted PCs from RRRF post-ROP both alone and in-combination with REP are less than 1% of the applicable annual critical level or load and 10% of the applicable weekly and 24-hour critical levels, with the exception of impacts at receptor ER3 (Inner Thames Marshes SSSI) and ER8 (Ingrebourne Marshes SSSI).

6.2. The predicted PCs from the RRRF post-ROP both alone and in-combination with REP do not exceed 100% of the applied critical levels or loads for any of the pollutants assessed at the locally designated ecological receptor locations.

6.3. Therefore, the impacts of the RRRF post-ROP on ecological receptors apart from Inner Thames Marshes SSSI and Ingrebourne Marshes SSSI sites are considered to be 'insignificant'.

6.4. Further analysis has been undertaken of the predicted impacts at Inner Thames Marshes SSSI and Ingrebourne Marshes SSSI in the following sections.

Inner Thames Marshes SSSI

6.5. **Table 6-1** presents the maximum predicted PCs at the Inner Thames Marshes SSSI from the RRRF post-ROP (alone and in-combination with REP) as a percentage of the relevant critical loads and levels.

Table 6-1 Process Contribution and Predicted Environmental Concentrations at the Inner Thames Marshes SSSI

Pollutant and Averaging Period	PC (as % of CL)	PEC (as % of CL)	Change in PC (as % of CL)	In-combination PC (as % of CL)	In-combination PEC (as % of CL)
Annual mean NOx	5.7%	**136.1%**	-0.2%	7.3%	**137.6%**
24-hour NOx	11.9%	73.4%	-0.3%	15.0%	76.5%
Annual mean SO_2	1.9%	12.8%	-0.3%	2.9%	13.8%
Annual mean NH_3	3.2%	77.5%	0.2%	5.3%	79.6%
Weekly HF	5.6%	65.6%	0.5%	9.3%	69.3%
24-hour HF	1.0%	7.0%	0.1%	1.6%	7.6%
Annual Nitrogen deposition	3.4%	95.1%	0.1%	5.2%	96.9%
Annual Acid deposition	Not Sensitive				

Exceedances highlighted in bold.

6.6. With the exception of annual mean NOx, the impact of RRRF post-ROP, both alone and in-combination with REP is below the relevant critical levels and loads and therefore it can be concluded that the impacts will cause 'no likely damage'.

6.7. In relation to the potential impacts of NOx, the main potential for effects on the habitat are likely to be as a result of nitrogen deposition, which does not exceed the critical load. Furthermore, the predicted annual mean NOx concentration from RRRF post-ROP is lower than from the currently permitted and operational RRRF and it is therefore considered that the NOx impacts are unlikely to damage or affect the integrity of the SSSI.

Ingrebourne Marshes SSSI

6.8. **Table 6-2** presents the PCs at Ingrebourne Marshes SSSI from the RRRF post-ROP (alone and in-combination with REP) as a percentage of the relevant critical loads and levels.

Table 6-2 Process Contribution and Predicted Environmental Concentrations at the Ingerbourne Marshes SSSI

Pollutant and Averaging Period	PC (as % of CL)	PEC (as % of CL)	Change in PC (as % of CL)	In-combination PC (as % of CL)	In-combination PEC (as % of CL)
Annual mean NOx	2.5%	**110.6%**	-0.1%	3.6%	**111.6%**
24-hour NOx	6.2%	57.2%	-0.1%	8.2%	59.2%
Annual mean SO_2	0.8%	10.2%	-0.1%	1.5%	10.8%
Annual mean NH_3	1.4%	75.7%	0.1%	2.8%	77.2%
Weekly HF	2.7%	62.7%	0.2%	4.9%	64.9%
24-hour HF	0.5%	6.5%	<0.1%	0.9%	6.9%
Annual Nitrogen deposition	2.0%	**124.2%**	0.1%	3.7%	**125.9%**
Annual Acid deposition	Not Sensitive				

Exceedances highlighted in bold.

6.9. With the exception of annual mean NOx and nitrogen deposition, the impact of RRRF post-ROP, both alone and in-combination with REP is below the relevant critical levels and loads and therefore it can be concluded that the impacts will cause 'no likely damage'.

6.10. In relation to the potential impacts of NOx, the predicted annual mean NOx concentration from RRRF post-ROP is lower than from the currently permitted and operational RRRF and it is therefore considered that the NOx impacts are unlikely to damage or affect the integrity of the SSSI.

6.11. In relation to nitrogen deposition, a review of the unit conditions provided by Natural England does not indicate and adverse effects linked to nitrogen deposition and therefore it is considered that the integrity of the SSSI is not likely to be compromised by the small additional contribution from RRRF post-ROP.

7. Conclusions

7.1. An air emission risk assessment utilising atmospheric dispersion modelling assessment has been undertaken to support application to vary the Environmental Permit for RRRF to include the proposed changes due to ROP.

7.2. In relation to human health, the emissions from the operation of the RRRF post-ROP (both alone and in-combination with REP) are for a majority of pollutants and averaging periods considered to be 'insignificant' at the location of maximum impact.

7.3. Where impacts are not classified as 'insignificant' (i.e. PC>1% of EAL) the predicted impacts of the RRRF post-ROP alone and in-combination with REP do not lead to any exceedances of EALs and do not constitute 'significant pollution'.

7.4. In relation to the impact on ecologically sensitive sites, at all national and international protected statutory designated sites the predicted PCs from RRRF post-ROP both alone and in-combination with REP are less than 1% of the applicable annual critical level or load and 10% of the applicable weekly and 24-hour critical levels, with the exception of impacts at receptor ER3 (Inner Thames Marshes SSSI) and ER8 (Ingrebourne Marshes SSSI).

7.5. The predicted PCs from the RRRF post-ROP both alone and in-combination with REP do not exceed 100% of the applied critical levels or loads for any of the pollutants assessed at the locally designated ecological receptor locations.

7.6. Therefore, the impacts of RRRF post-ROP (both alone and in-combination with REP) are considered 'insignificant' at all designated ecological sites with the exception of the Inner Thames Marshes SSSI and Ingrebourne Marshes SSSI.

7.7. Further consideration has been given to the potential impacts of NOx and nitrogen deposition at the Inner Thames Marshes SSSI and Ingrebourne Marshes SSSI as the baseline critical levels and loads are in exceedance and impacts from the RRRF post-ROP are not 'insignificant' (i.e. >1% of the EAL).

7.8. In relation to the potential impacts of NOx, the predicted annual mean NOx concentration from RRRF post-ROP is lower than from the currently permitted and operational RRRF and it is therefore considered that the NOx impacts are unlikely to damage or affect the integrity of the SSSI's.

7.9. In relation to nitrogen deposition at the Ingrebourne Marshes SSSI, a review of the unit conditions provided by Natural England does not indicate any adverse effects linked to nitrogen deposition and therefore it is considered that the integrity of the SSSI is not likely to be compromised by the small additional contribution from RRRF post-ROP.

Appendix A Point of Maximum Impact Results

Table A-1 Point of Maximum Impact – Long-term Results

Pollutant	Long-term EAL	Averaging Period	RRRF (Current)		RRRF Post-ROP				Cumulative – ROP + REP			
			PC ($\mu g/m^3$)	PC as % EAL	PC ($\mu g/m^3$)	PC as % EAL	PEC ($\mu g/m^3$)	PEC as % EAL	PC ($\mu g/m^3$)	PC as % EAL	PEC ($\mu g/m^3$)	PEC as % EAL
PM_{10}	40	annual	0.13	0.3%	0.07	0.2%	20.07	50.2%	0.12	0.3%	20.12	50.3%
$PM_{2.5}$	20	annual	0.13	0.7%	0.07	0.3%	12.07	60.3%	0.12	0.6%	12.12	60.6%
NO_2	40	annual	1.86	**4.7%**	1.70	**4.2%**	29.70	**74.2%**	2.18	**5.5%**	30.18	**75.5%**
HF	16	monthly average	0.05	0.3%	0.05	0.3%	0.55	3.4%	0.07	0.5%	0.57	3.6%
TOC	2.25	annual (1,3-butadiene)	0.13	**5.8%**	0.13	**6.0%**	0.26	11.8%	0.23	**10.4%**	0.36	16.1%
NH_3	180	annual	0.13	0.1%	0.13	0.1%	3.08	1.7%	0.23	0.1%	3.18	1.8%
Cd	0.005	annual	6.64E-04	**13.3%**	2.69E-04	**5.4%**	6.08E-04	12.2%	4.69E-04	**9.4%**	8.07E-04	16.1%
Hg	0.25	annual	6.64E-04	0.3%	2.69E-04	0.1%	1.87E-03	0.7%	4.69E-04	0.2%	2.07E-03	0.8%
As	0.003	annual	3.32E-04	**11.1%**	3.37E-04	**11.2%**	1.26E-03	42.0%	5.86E-04	**19.5%**	1.51E-03	50.3%
Cr	5	annual	1.22E-03	<0.1%	1.24E-03	<0.1%	3.32E-03	0.1%	2.16E-03	<0.1%	4.23E-03	0.1%
CrVI	0.0002	annual	1.73E-06	0.9%	1.75E-06	0.9%	4.17E-04	**208.6%**	3.05E-06	**1.5%**	4.18E-04	**209.2%**
Cu	10	annual	3.85E-04	<0.1%	3.91E-04	<0.1%	1.11E-02	0.1%	6.80E-04	<0.1%	1.14E-02	0.1%
Pb	0.25	annual	6.68E-04	0.3%	6.77E-04	0.3%	1.13E-02	4.5%	1.18E-03	0.5%	1.18E-02	4.7%
Mn	0.15	annual	7.97E-04	0.5%	8.08E-04	0.5%	6.71E-03	4.5%	1.41E-03	0.9%	7.31E-03	4.9%
Ni	0.02	annual	2.92E-03	**14.6%**	2.96E-03	**14.8%**	4.23E-03	21.1%	5.15E-03	**25.8%**	6.42E-03	32.1%
Sb	5	annual	1.53E-04	<0.1%	1.55E-04	<0.1%	1.45E-03	<0.1%	2.69E-04	<0.1%	1.57E-03	<0.1%
V	5	annual	7.97E-05	<0.1%	8.08E-05	<0.1%	1.55E-03	<0.1%	1.41E-04	<0.1%	1.61E-03	<0.1%
PAH	0.001	annual	2.79E-06	0.3%	2.83E-06	0.3%	1.63E-04	16.3%	4.92E-06	0.5%	1.65E-04	16.5%
	0.00025	annual (BaP)	2.79E-06	**1.1%**	2.83E-06	**1.1%**	1.63E-04	65.1%	4.92E-06	**2.0%**	1.65E-04	66.0%
PCCD/PCDF	N/A	annual	1.33E-09	N/A	8.08E-10	N/A	9.81E-09	N/A	1.41E-09	N/A	1.04E-08	N/A
PCBs	0.2	annual	6.64E-05	<0.01%	6.73E-05	<0.1%	8.95E-05	<0.1%	1.17E-04	0.1%	1.39E-04	0.1%

Exceedances of the 1% PC and 70% PEC screening criteria are highlighted in bold

Table A-2 Point of Maximum Impact – Short-term Results

Pollutant	Short-term-term EAL	Averaging Period	RRRF (Current)		RRRF Post-ROP				Cumulative – ROP + REP			
			PC ($\mu g/m^3$)	PC as % EAL	PC ($\mu g/m^3$)	PC as % EAL	PEC ($\mu g/m^3$)	PEC as % EAL	PC ($\mu g/m^3$)	PC as % EAL	PEC ($\mu g/m^3$)	PEC as % EAL
PM_{10}	50	24-hr 90.41%ile	0.41	0.8%	0.21	0.4%	23.81	47.6%	0.34	0.7%	23.94	47.9%
NO_2	200	1-hour, 99.79%ile	8.81	4.4%	7.96	4.0%	63.96	32.0%	9.93	5.0%	65.93	33.0%
SO_2	125	24-hour 99.19%ile	4.12	3.3%	3.34	2.7%	4.68	3.7%	4.28	3.4%	5.62	4.5%
	350	1-hour 99.73%ile	6.10	1.7%	4.89	1.4%	7.16	2.0%	7.23	2.1%	9.50	2.7%
	266	15-min 99.9%ile	7.16	2.7%	5.85	2.2%	8.57	3.2%	8.16	3.1%	10.89	4.1%
CO	10000	8-hr running average	6.26	0.1%	6.36	0.1%	248.56	2.5%	9.91	0.1%	252.11	2.5%
	30000	1-hr max	8.02	<0.1%	8.20	0.0%	354.20	1.2%	15.22	0.1%	361.22	1.2%
HF	160	1-hr max	0.16	0.1%	0.16	0.1%	1.16	0.7%	0.30	0.2%	1.30	0.8%
HCl	750	1-hr max	1.60	0.2%	1.31	0.2%	1.89	0.3%	2.11	0.3%	2.69	0.4%
TOC	195	1-hr max (benzene)	1.60	0.8%	1.64	0.8%	2.60	1.3%	3.04	1.6%	4.00	2.1%
NH3	2500	1-hr max	1.60	0.1%	1.64	0.1%	7.54	0.3%	3.04	0.1%	8.94	0.4%
Hg	7.5	1-hr max	8.02E-03	0.1%	3.28E-03	<0.1%	6.48E-03	0.1%	6.09E-03	0.1%	9.29E-03	0.1%
Cr	150	1-hr max	1.48E-02	<0.1%	1.51E-02	<0.1%	1.92E-02	<0.1%	2.80E-02	<0.1%	3.22E-02	<0.1%
Cu	200	1-hr max	4.65E-03	<0.1%	4.76E-03	<0.1%	2.61E-02	<0.1%	8.83E-03	<0.1%	3.02E-02	<0.1%
Mn	1500	1-hr max	9.62E-03	<0.1%	9.84E-03	<0.1%	2.17E-02	<0.1%	1.83E-02	<0.1%	3.01E-02	<0.1%
Sb	150	1-hr max	1.84E-03	<0.1%	1.89E-03	<0.1%	4.49E-03	<0.1%	3.50E-03	<0.1%	6.10E-03	<0.1%
V	1	1-hr max	9.62E-04	0.1%	9.84E-04	0.1%	3.92E-03	0.4%	1.83E-03	0.2%	4.76E-03	0.5%
PCBs	6	1-hr max	8.02E-04	<0.1%	8.20E-04	<0.1%	8.64E-04	<0.1%	1.52E-03	<0.1%	1.57E-03	<0.1%