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Shropshire In-Vessel Composting Facility



Veolia

Air Quality Assessment – Addendum for Revised Emission Limit

ENGINEERING CONSULTING

Document approval

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1 Introduction

Fichtner Consulting Engineers Ltd (Fichtner) has been engaged by Veolia ES Shropshire Limited (the Client) to prepare an updated Air Quality Assessment (AQA) to support the planning application for an in-vessel composting facility (the Facility) to be installed at the former Befesa salt slag processing facility, Fenn's Bank, near Whitchurch.

The Facility will treat up to 100,000 tonnes per annum (tpa) of compostable waste. The activities to be undertaken will be permitted by Natural Resources Wales (NRW) under the Environmental Permitting (England and Wales) Regulations (2016), and subsequent amendments.

Previous air quality assessment reports (UF00174-0030-0001SMN Shropshire IVC Facility Air Quality Assessment_r2, dated 23 May 2025, and _r3, dated 4 February 2026) have been reviewed by NRW as part of the pre-application consultation (PAC) and for the planning application for the Facility. NRW's feedback is summarised as follows:

1. For the application to proceed the ammonia process contribution from the Facility is to be less than 1% of the Critical Level (1 µg/m³) at all locations within the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SAC that are capable of supporting the SAC qualifying features; and
2. The dispersion modelling used to reach the conclusion under point 1 is to be based on a single ammonia emission limit value, rather than the seasonally varying emissions scenario previously applied;
3. In-combination sources require consideration.

In response to NRW's comments the assessment has been updated to identify the closest point in the SAC which can support the most sensitive SAC qualifying habitat (i.e. degraded raised bogs still capable of natural regeneration). This closest point to the Facility that is within the SAC that has a peat soil type has been identified using Soilscape soil type mapping[1].

The ammonia ELV for stack emissions from the Facility has been amended, and consideration given to the likely operational availability of the Facility's air extraction system, such that the ammonia process contribution from the Facility is less than 1% of the Critical Level at the closest location capable of supporting the SAC qualifying features. No other changes are proposed. Therefore, this addendum presents the revised inputs and results of the modelling of ammonia emissions. It is to be read in conjunction with the two previous Air Quality Assessment reports referenced above.

A detailed search of planning and environmental permitting registers has been undertaken. No other potentially significant recent or planned sources of ammonia or nitrogen deposition have been identified within 5 km of the Facility, so an in-combination assessment is not considered necessary.

[1] LandIS®, Cranfield Environment Centre, Cranfield University. Obtained via https://www.landis.org.uk/soilscapes/

2 Sensitive Receptors

The sensitive receptors included in this study are the same as those in the previous AQAs, with the addition of a new point at the closest part of the SAC where peat soil is present. This point is designated E18 and is located at X = 350357, Y = 338813. A figure showing the location of this receptor along with the soil mapping used to identify the location is presented as Appendix A.

3 Dispersion Modelling Inputs

All dispersion modelling inputs are unchanged from the previous AQAs, except that:

- Seasonally varying emissions concentrations have not been considered;
- A constant ammonia ELV of 2 mg/m³ has been applied. The technology provider for the project has confirmed that this ELV is achievable; and
- The availability of the air extraction system has been assumed to be 355 days / 8,520 hours per year, which is an availability of 97.3%. This is based on Veolia's experience operating similar facilities, for which the air extraction system is turned off for one to two days every two months for maintenance and cleaning, plus a further one to two days per year for an annual service.

The revised model input parameters for ammonia emissions are presented in Table 1.

Table 1: Biofilter Stack Source Data

Item	Unit	Value		
Stack Data				
Height	m			27
Internal diameter	m			1.46
Location	m, m			350631, 339158
Flue Gas Conditions				
Temperature	°C			30
		100% flow	**70% flow**	**40% flow**
Volume at reference conditions[(1)]	Nm³/s	30.0	21.0	12.1
Volume at actual conditions	Am³/s	33.3	23.3	13.3
Flue gas exit velocity	m/s	20.0	14.0	8.0
Ammonia ELV	mg/Nm³			2
Ammonia release rate (g/s)	g/s	0.0601	0.0420	0.0240

Note:
[(1)] Reference conditions of 273K, no correction for oxygen or water vapour.

4 Results

4.1 Human health

Table 2 presents the results of the dispersion modelling at the point of maximum impact of the Facility. The maximum predicted concentrations are based on the following:

- Grid spacing – 15 m fine grid nested within a wider grid of 90 m resolution;
- The maximum impact over five years of weather data from 2018 to 2022 from the Shawbury meteorological recording station;
- Ammonia emission concentrations at the proposed ELV of 2 mg/Nm^3;
- Operation at 70% load during daytime (07:00 – 19:00) and 40% overnight (19:00 – 07:00);
- Operation at 100% load during the worst-case weather conditions for dispersion, for the assessment of short-term impacts; and
- Annual availability of the air extraction system is 97.3% (used in calculation of annual mean impacts only).

Table 2: Dispersion Modelling Results – Point of Maximum Impact Outside of Installation Boundary

Pollutant	Quantity	Units	EAL	Bg Conc.	PC at point of max impact outside installation boundary						Max as % of EAL	PEC (PC +Bg)	PEC as % of EAL
					2018	2019	2020	2021	2022	Max			
Ammonia	Annual mean	µg/m³	180	3.40	0.06	0.05	0.06	0.06	0.07	0.07	0.04%	3.47	1.93%
	Hourly mean	µg/m³	2,500	6.80	2.16	2.12	2.21	2.28	2.29	2.29	0.09%	9.09	0.36%

As shown, with regard to human health the PC of ammonia is less than 1% of the long-term and 10% of the short-term EALs for both scenarios. Therefore, all impacts on human health can be screened out as 'insignificant'.

For completeness, the annual mean and maximum 1-hour PC at each receptor location identified are presented in Table 3.

Table 3: Ammonia Impacts at Human Receptor Locations

Receptor	Annual mean		Maximum 1-hour mean	
	µg/m³	% of EAL	µg/m³	% of EAL
R1	0.04	0.02%	1.03	0.04%
R2	0.02	0.01%	0.95	0.04%
R3	0.02	0.01%	0.84	0.03%
R4	0.02	0.01%	1.03	0.04%
R5	<0.01	<0.01%	0.52	0.02%
R6	0.01	0.01%	0.69	0.03%
R7	0.01	<0.01%	0.46	0.02%
R8	0.01	<0.01%	0.36	0.01%
R9	0.03	0.02%	0.81	0.03%

4.2 Ecology

4.2.1 Airborne ammonia emissions – assessment against Critical Levels

The impact of emissions has been compared to the ammonia Critical Level of 1 µg/m³. Further assessment has been undertaken where the PC is greater than 1% of the long Critical Level at European and UK designated sites, or greater than 100% of the Critical Level at local nature sites.

The maximum annual mean ammonia PCs from the Facility at each identified ecological receptor are presented in Table 4.

Impacts that cannot be screened out as 'insignificant' are highlighted. As detailed in the previously submitted AQA_r3, NRW's PAC response noted that receptors E10, E12, E13, and E14 overlap with the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SSSI, SAC, and Ramsar designations. These receptor locations have been used to assess the impact of emissions on the features for which the local nature sites are designated. However, as these also lie within the SSSI, SAC, and Ramsar designations, the assessment criteria applicable to European and UK designated sites (as detailed in section 5.1.2 of the AQA) have been applied at these receptors.

Table 4: Airborne Ammonia Impacts at Ecological Receptors

Receptor	Scenario 1 – at ELV	
	µg/m³	% of Critical Level
European and UK designated sites		
E1	0.012	**1.19%**
E2	0.001	0.08%
E3	0.001	0.07%
E4	0.001	0.05%
E5	0.001	0.12%
E6	0.001	0.08%
E7	<0.001	0.02%
E8	<0.001	0.02%
E9	<0.001	0.01%
Local nature sites		
E10	0.009	0.93%
E11	0.026	2.65%
E12	0.007	0.73%
E13	0.003	0.35%
E14	0.003	0.26%
E15	0.005	0.48%
E16	0.004	0.40%
E17	0.004	0.42%
Additional receptor – maximum within SAC with peat soil		
E18	0.00997	0.997%

As shown, with the reduced ELV and accounting for availability (and with no allowance made for seasonally varying emissions concentrations), the annual mean ammonia impact is less than the screening criteria and is 'insignificant' at all receptor locations, except for at E1; however, as shown on the figure in Appendix A, this receptor location lies outside of the peat basin and is not capable of supporting the SAC qualifying features. The impact is less than 1% of the Critical Level at the new receptor E18, which is the closest part of the SAC that is capable of supporting the SAC qualifying habitat. For additional information, the predicted ammonia process contribution at E18 for each of the five years of weather data is presented in Table 5.

Table 5: Interannual Variability at E18

Year of weather data	Process contribution	
	µg/m³	% of Critical Level
2018	0.00631	0.631%
2019	0.00270	0.270%
2020	0.00759	0.759%
2021	0.00997	0.997%
2022	0.00410	0.410%
Average	0.00614	0.614%

As shown in Table 5 the maximum is considerably higher the average over five years.

As shown in Table 4 the reduced ELV also brings the impact below 1% of the Critical Level at E10 and E12 which are constituent parts of the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SAC. E11 is not a constituent part of a European or UK designated site.

An illustrative plot file of the annual mean ammonia PC is provided as Appendix A, which shows the extent of impacts greater than 1% of the Critical Level.

The impact is less than 1% at all locations with European and UK designated sites where qualifying features are present, or that are capable of supporting the qualifying features. Therefore, it is considered that ammonia emissions from the Facility would not have a significant effect.

4.2.2 Deposition of emissions – assessment against Critical Loads

The revised deposition results are summarised in Table 6. The results summary is based on the following approach:

- A constant ammonia ELV of 2 mg/Nm³ and availability of 97.3% have been applied;
- Where more than one sensitive habitat (with short vegetation or woodland) is present in the designated site, the impact has been presented for the habitat that experiences the greatest impact as a percentage of the Critical Load; and
- The average over five years of weather data has been presented; this is considered appropriate as the effects of deposition impacts occur over multi-year timescales.

Table 6: Deposition Results Summary

Ref	Receptor name	Nitrogen deposition			Acid deposition		
		Min CL kgN/ha/yr	PC kgN/ha/yr	PC %CL	Min CLmaxN keq/ha/yr	PC keq/ha/yr	PC %CL
European and UK designated sites							
E1	Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses	5	0.038	0.75%	0.534	0.0027	0.50%
E2	Brown Moss	2	0.004	0.19%	0.545	0.0003	0.05%
E3	Oss Mere SSSI (Midland Meres and Mosses Phase 2 Ramsar)	10	0.005	0.05%	1.806	0.0003	0.02%
E4	Quoisley Meres SSSI (Midland Meres and Mosses Phase 1 Ramsar)	15	0.002	0.02%	-(1)	-	-
E5	Llyn Bedydd SSSI (Midland Meres and Mosses Phase 2 Ramsar)	2	0.005	0.27%	1.661	0.0004	0.02%
E6	Hanmer Mere SSSI (Midland Meres and Mosses Phase 2 Ramsar)	-(1)	-	-	-(1)	-	-
E7	West Midland Mosses SAC (Midland Meres and Mosses Phase 1 and Clarepool Moss SSSI)	5	0.001	0.02%	0.511	0.0001	0.01%
E8	Cole Mere SSSI (Midland Meres and Mosses Phase 2 Ramsar)	10	0.001	0.01%	1.607	0.0001	0.01%
E9	Brownheath Moss SSSI (Midland Meres and Mosses Phase 2 Ramsar)	5	<0.001	0.01%	1.6	<0.0001	<0.01%
Local nature sites							
E10	Fenn's, Whixall & Bettisfield Mosses	5	0.029	0.58%	0.534	0.0021	0.39%
E11	Fenn's Rough Ancient Woodland	10	0.182	1.82%	1.672	0.0130	0.78%
E12	Fenn's Wood Ancient Woodland North	10	0.047	0.47%	0.546	0.0034	0.61%
E13	Fenn's Wood Ancient Woodland Mid	10	0.022	0.22%	0.547	0.0016	0.29%

Ref	Receptor name	Nitrogen deposition			Acid deposition		
		Min CL kgN/ha/yr	PC kgN/ha/yr	PC %CL	Min CLmaxN keq/ha/yr	PC keq/ha/yr	PC %CL
E14	Fenn's Wood Ancient Woodland South	10	0.016	0.16%	0.547	0.0012	0.22%
E15	Unnamed Ancient Woodland 1	10	0.031	0.31%	0.547	0.0022	0.40%
E16	Unnamed Ancient Woodland 2	10	0.027	0.27%	1.75	0.0019	0.11%
E17	Unnamed Ancient Woodland 3	10	0.027	0.27%	1.777	0.0019	0.11%
Additional receptor – maximum within SAC with peat soil							
E18	Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses	5	0.032	0.64%	0.534	0.0023	0.43%
Note: *(1) No Critical Loads defined in APIS.*							

As shown, nitrogen and acid deposition impacts on sensitive habitats are all less than the relevant screening criteria for the habitat type and designation, and are 'insignificant' at all receptor locations, noting that E11 for which nitrogen deposition is predicted to be 1.82% of the Critical Load is not a constituent part of a European or UK designated site. As such, no significant impacts are predicted.

5 Conclusions

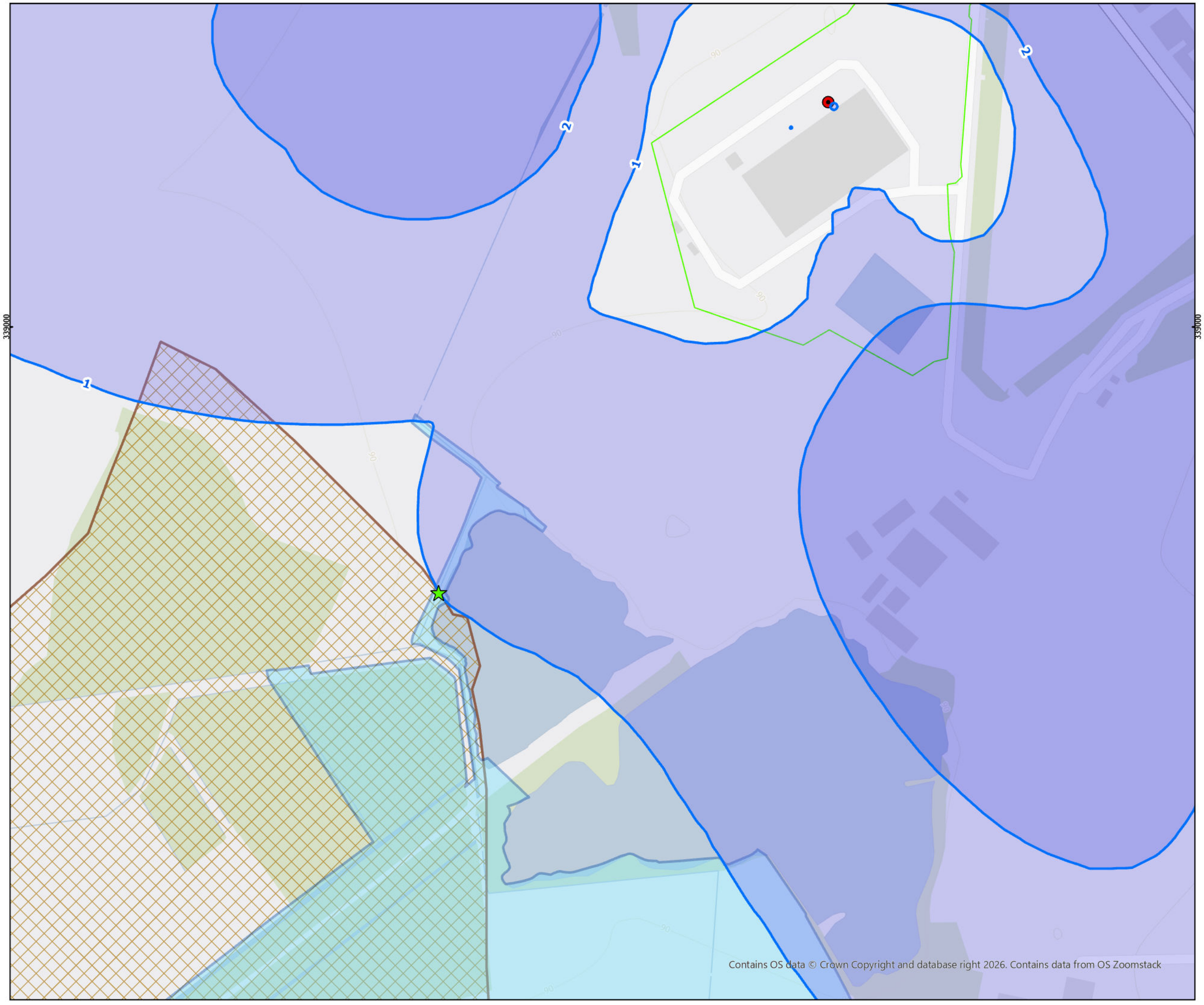
This Air Quality Assessment Addendum has been prepared to respond to NRW's PAC advice. The dispersion modelling has been updated for a lower ammonia ELV of 2 mg/m³ and for the expected 97.3% availability of the air extraction system.

With the revised parameters, the impact of emissions of ammonia on both airborne ammonia concentrations and on nitrogen and acid deposition can be screened out as 'insignificant' at the closest part of the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SAC that is capable of supporting the SAC qualifying features. No other potentially significant impacts on human health or ecology have been identified.

Based on the above, it is concluded that the operation of the Facility will not have a significant effect on local air quality, the general population or the local community. As such there should be no air quality constraint in granting planning consent or an EP to operate for the Facility.

Appendices

A Figure



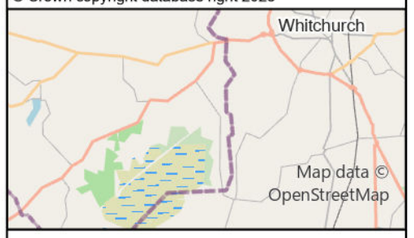
Legend

- Installation boundary
- Stack
- Ancient Woodlands
- SACs
- Soilscapes peat extent
- E18
- Ammonia as % of Critical Level - 2 mg/Nm³ ELV

Notes: Impact as % of lower Critical Level of 1 µg/m³

Client:	Veolia
Site:	Fenn's Bank IVC EP Application
Project:	Air Quality Assessment
Title:	Ammonia Impact at E18
Drawn by: SMN	Date: 10/07/2026

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0 0.03 0.05 0.1 km

Scale: 1:2,500

N

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