

Appeal by Gladman Developments Limited

Land at Hill Farm, Hempstead lane, Gloucester

LPA Reference: 20/00315/OUT

Inspectorate Reference: APP/U1620/W/22/3296510

Proof of Evidence on Odour

Malcolm Walton

WARDELL ARMSTRONG LLP

AUGUST 2022

1 Introduction and Personal Details

- 1.1 My name is Malcolm Thomas Walton. I hold a Bachelor of Science degree in Environmental Health and the Institute of Acoustics diploma in Noise and Vibration Control. I am a fully qualified Environmental Health Officer, now working in private consultancy.
- 1.2 I am a Member of the Chartered Institute of Environmental Health and an Associate Member of the Institute of Acoustics. I am a Technical Director and Principal Environmental Scientist with Wardell Armstrong with whom I have been employed for more than twenty years.
- 1.3 I regularly assess the noise and air quality impacts of proposed and existing developments, and have given evidence at public inquiries and in court as a Consultant and as a Local Authority Officer.
- 1.4 I previously worked for nine years for Sefton Metropolitan Borough Council in the Pollution Control section with responsibilities for pollution investigation, assessment and enforcement.
- 1.5 The evidence which I have prepared and provide for this Appeal is true to the best of my knowledge and belief. I confirm that the opinions expressed are my true and complete professional opinions in the matters to which they refer.

Scope of Evidence

- 1.6 In March 2020 Gladman Developments Limited submitted a planning application to Gloucester City Council (GCC) for residential development at Land at Hill Farm, Hempstead Lane, Gloucester. The proposed development comprises up to 245 dwellings with public open space, structural planting and landscaping, surface water flood mitigation and attenuation, and vehicular access point from Hempstead Lane. All matters reserved except for means of vehicular access (Application ref 20/00315/OUT). However, the number of proposed dwellings has subsequently been reduced to 215.
- 1.7 The application had not been satisfactorily progressed by GCC in April 2022, so the applicant has lodged an appeal for non determination. The application was presented to GCC Planning Committee on 5th July 2022 for assessment of the proposals and for resolution upon those matters that will form the Councils case in this appeal. Whilst I have not seen a decision notice or Committee resolution, a statement of case of the

local planning authority states that the committee accepted the recommendation that the Council be minded to refuse the application proposals for eight reasons, one of which, reason for refusal number three, relates to odour.

1.8 Reason for refusal 3 states –

‘The proposal has failed to demonstrate that the proposed residential use of the site would be acceptable and that new occupants would not be subject to unacceptable levels of odour, resulting in a poor standard of amenity and environmental quality and that this would not result in an incompatibility of uses with the Netheridge Sewage Treatment Works. Accordingly the proposal would be contrary to policies SD4 and SD14 of the Gloucestershire, Cheltenham and Tewkesbury Joint Core Strategy 2011-2031 (December 2017), policy FRP12 of the Revised Deposit Local Plan 2002, policy C6 of the emerging Gloucester City Plan and policy WCS11 of the Gloucestershire Waste Core Strategy 2012 and the National Planning Policy Framework.’

1.9 My evidence deals only with the odour impacts associated with the proposed scheme.

1.10 List of documents referred to in this proof:

- Odour Assessment, Wardell Armstrong January 2020 (CD1.25)
- Review of Odour Assessment, Phlorum August 2020 (CD4.1)
- Odour Assessment, Wardell Armstrong June 2021 (CD2.4)
- Cordon Sanitaire Evidence Study Netheridge STW, Phlorum September 2019 (CD7.12)
- Wardell Armstrong Odour rebuttal letter GM10710/001 3rd May 2022 (CD6.3)
- Odour Assessment, Wardell Armstrong July 2022 (CD6.15)
- GCC Planning Committee Report 5th July 2022 (CD7.18)
- Institute of Air Quality Management (IAQM), ‘Guidance on the assessment of odour for planning’ 2018 (CD 7.11).

Structure of Evidence

1.11 This evidence deals with the assessment of the likely odour impacts associated with the proposed development which is the subject of this appeal.

1.12 Section 2 discusses the odour assessment, dated January 2020, carried out by Wardell Armstrong in support of the application.

- 1.13 Section 3 discusses the detailed odour assessment, June 2021, carried out by Wardell Armstrong.
- 1.14 Section 4 discusses the updated detailed odour assessment, July 2022, carried out by Wardell Armstrong.
- 1.15 Section 5 sets out policy considerations
- 1.16 Section 6 describes the benchmark/assessment criteria
- 1.17 Section 7 presents the agreement reached with GCC and their advisors on 11th August 2022
- 1.18 Section 8 sets out my conclusions.

2 ODOUR ASSESSMENT JANUARY 2020

- 2.1 To consider the potential for odour from the sewage treatment works (STW) to give rise to an adverse effect on the proposed dwellings, an initial qualitative odour risk assessment was undertaken and presented in Odour Assessment, Report 006 dated January 2020.
- 2.2 Carried out in accordance with the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of odour for planning' (2018) (CD7.11), the assessment comprises an odour risk assessment based upon a review of geographical and meteorological conditions, odour complaint history and four 'sniff test' odour observation surveys.
- 2.3 During consultation with GCC, we were sent a link to a recently released 'Cordon Sanitaire Evidence Study' Netheridge STW report, produced for GCC by Phlorum Limited (dated 2019). The proposed development site is located within the defined area of the Cordon Sanitaire recommended by Phlorum. Review of the study showed that some of the data used was out of date, possibly overly conservative and certainly not representative of current operational practices at Netheridge STW. In particular, the study did not take account of process upgrades to certain aspects of the works, including the introduction of new odour control systems which will have reduced emissions from some odorous sources at the works.
- 2.4 The desk-based assessment describes the risk of odour impact at the southern boundary of the site as 'medium', reducing to 'low' further north into the site.
- 2.5 Review of the odour complaint history for the previous five years revealed that the Council had a record of just twelve odour complaints relating to the STW. Eleven of

these were located to the south of the STW, with the one remaining complaint originating from the north east of the proposed development site. The development site is located to the north east of the STW and so this shows there is potential for greater odour impact to the south of the STW (where residents are located in much closer proximity to the works).

- 2.6 In addition, sniff tests site observations were carried out across the development site during 84 observation periods during site visits made over four separate days. Whilst odour was detected at various locations across the site, it was detected infrequently and at low intensities. Higher odour intensities were recorded only along the southern boundary of the site. Odour effects were calculated as 'negligible' during 95.24% of observations. Slight adverse effects from the STW were calculated at two monitoring locations adjacent to the southern boundary of the development site.
- 2.7 The IAQM guidance recommends that the overall judgement of significance should be based on the findings of numerous assessment tools and that considerable weight should normally be given to observational findings (such as complaints analysis) and to sensory assessments (such as sniff tests).
- 2.8 Overall, taking into account the results of the qualitative risk-based assessment, the results of the sniff tests undertaken within the proposed development site, complaint history and the local meteorological data, the most likely impact from odour from the Netheridge STW on the proposed development site as a whole was judged to be 'not significant', in accordance with the IAQM guidance.
- 2.9 Phlorum consultants carried out a review of the report on behalf of GCC (CD4.1). Phlorum considered that there was insufficient information to conclude there would be no significant effect and recommended further assessment in the form of detailed odour dispersion modelling using 'appropriate library data'.

3 ODOUR ASSESSMENT JUNE 2021

- 3.1 In 2021 the existing Wardell Armstrong odour assessment was updated with an additional assessment tool to include detailed odour dispersion modelling. This followed consultation with staff at Severn Trent (ST), the operators of Netheridge STW, to agree appropriate odour emission rate data.
- 3.2 The 'Cordon Sanitaire Evidence Study' by Phlorum contained detailed odour modelling using sampling data collected at the STW in 2008 and library emission factors to provide conservative estimates from specific treatment processes. However, it is

understood that the data used within this report was based on information and odour emission rates from before a number of upgrades took place at the STW. I therefore considered the odour contours predicted within that report to be overly robust and not representative of current operational practices at the STW.

- 3.3 During consultation with ST staff, more representative library odour emission rates associated with upgraded processes were presented and agreed for use in a dispersion model. (Email correspondence with ST is included within Appendix A to CD6.15).
- 3.4 The results of the modelling assessment show that the $3 \text{ C}_{98} \text{ ou}_E/\text{m}^3$ odour benchmark criteria contours are predicted to impact small sections of the southern half of the development site in 3 of the 5 years of meteorological data used in the assessment.
- 3.5 The development framework plan for the proposed site was prepared to incorporate a setback distance from the southern boundary with no residential development proposed in the southern areas of the proposed development site. This correlates well with the results of both the odour observation site visits, which predict a negligible odour impact in the northern half of the development site where residential uses are proposed, and the results of the odour modelling assessment, which predict the proposed residential areas will not be impacted by the $3 \text{ C}_{98} \text{ ou}_E/\text{m}^3$ odour benchmark criteria in any of the five years assessed.
- 3.6 Again, taking the results of the modelling assessment, together with the odour observation results and odour complaint history, it was considered that the effects of odour from Netheridge STW on the proposed development site is negligible, which provides an overall 'not significant' effect.
- 3.7 Phlorum reviewed the report and provided comments via GCC's case officer, Joann Meneaud in an email dated 5th April 2022 (CD4.1).
- 3.8 Phlorum describes discrepancies or uncertainties regarding emission rates agreed with ST and suggests that the level of evidence required to support the application needs to be more robust. Phlorum therefore recommends that data should be obtained from measurement of actual odour emission at the STW by olfactometric sampling with specific reference to the following four treatment processes (sources of odour emission):
 - Primary Settlement Tanks (PST's)
 - Final Settlement Tanks (FST's)

- Odour Control Units (OCU's) associated with the Gravity Belt Thickener and Sludge and Blend Tank.

4 ODOUR ASSESSMENT JULY 2022

- 4.1 The 2022 Wardell Armstrong report presents a revised modelling exercise following odour sampling at the Netheridge STW. It was intended to obtain triplicate samples from all four sources during a sampling visit organized with the cooperation of ST. Unfortunately, at the time of the sampling visit, ST advised that due to a technical fault it would not be possible to undertake sampling at the works. Another date was agreed, however due to a further technical fault it was possible to sample only three of the four sources. Furthermore, the sample date coincided with a national heatwave which caused unprecedented high temperatures not seen in this country before. During the sampling exercise on the 18th of July 2022, temperatures reached 35°C at Netheridge STW. I consider that the odour emission rates captured during this period are likely to be elevated such that they are not representative of normal emissions. A further sampling visit was undertaken one week later to obtain a sample from the missing source and additional samples during more typical summer time temperatures.
- 4.2 The revised modelling used the results of the more representative sampling visit but an additional scenario using the 'worst case' results obtained during the extreme heat conditions is also presented.
- 4.3 The results of the updated modelling assessment using measured emission data show that the 3 C₉₈ ou_E/m³ odour benchmark criterion contours do not encroach into the development site boundary in any of the five years assessed. In the 'worst case' scenario, the 3 C₉₈ ou_E/m³ odour benchmark criterion contours are predicted to affect a strip within the eastern boundary of the site. It should be noted that this is not considered representative as the model uses this high emission rate (obtained during one of the hottest days ever recorded) and calculates odour dispersal using hourly wind speed and direction data for a whole year.
- 4.4 The assessment concludes that taking the results of the detailed modelling assessment, together with the odour observation results and previous odour complaint history, the effects of odour from Netheridge STW on the proposed development site is negligible, which correlates to a 'not significant' effect.

5 NATIONAL AND LOCAL POLICIES

National Planning Policy Framework (NPPF) 2021

5.1 With regard to national and local planning policy, the NPPF states in para 185:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.

5.2 The odour assessment work carried out by Wardell Armstrong has shown that the proposed development site is appropriate for its location as, in respect of odour from the Netheridge STW, it will not be exposed to significant impact when assessed in accordance with current guidance.

5.3 Para 187 states:

“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities..... Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed”.

5.4 A detailed and robust approach has been undertaken in the assessment of likely odour impact from Netheridge STW at the development site taking into account current guidance, consultation with the STW operator, Severn Trent and the comments of GCC’s technical advisor, Phlorum. Additional mitigation in the form of a set-back distance within the development site has been incorporated into the site design. Given the results of the assessment – a not significant effect, I consider that the proposed development will not place unreasonable constraints upon the operation of the STW. Furthermore, as stated in the Phlorum Cordon Sanitaire Evidence Study (CD7.12), Para 3.9 ...‘any future changes to the STW must demonstrate that they will not significantly increase the risk of local odour impacts’. As the 2022 Wardell Armstrong assessment has been based on current emissions from the STW it is considered robust as future emissions should not worsen.

Gloucester, Cheltenham and Tewkesbury Joint Core Strategy 2017

5.5 Sustainable Development Policies - SD4 and SD14

SD4 (iii) *“Amenity and space; New development should enhance comfort, convenience and enjoyment through assessment of the opportunities for light, privacy and external space, and the avoidance or mitigation of potential disturbances, including visual intrusion, noise, smell and pollution”.*

5.6 The odour assessment demonstrates a negligible not significant odour impact at the proposed new development which can therefore be said to avoid the potential disturbance associated with ‘smell’ from Netheridge STW.

5.7 SD14 Health and Environmental Quality - 2. *“New development must:*

- i. Cause no unacceptable harm to local amenity including the amenity of neighbouring occupants;*
- ii. Result in no unacceptable levels of air, noise, water, light or soil pollution or odour, either alone or cumulatively, with respect to relevant national and EU limit values;*
- iii. Result in no exposure to unacceptable risk from existing or potential sources of pollution”.*

5.8 No unacceptable harm to local amenity, unacceptable odour or exposure to unacceptable risk from existing sources of pollution was identified at the proposed development site during the assessments carried out by Wardell Armstrong.

Emerging Gloucester City Plan and Gloucester Local Plan, Second Stage Deposit 2002

5.9 Policy C6: Cordon sanitaire and Policy FRP12 both contain the following wording:

‘Development likely to be adversely affected by smell from Netheridge Sewage Works, within the Cordon Sanitaire defined on the policies map, will not be permitted’.

5.10 The planning committee report dated 5th July 2022 presenting the application (CD7.18) describes the emerging policy regarding the cordon sanitaire. Following the Examination in Public hearing sessions for the City Plan, the Inspector has set out that the cordon sanitaire policy should be treated as a trigger for assessment. C6 policy wording is proposed to be modified to:

‘Planning permission will be granted for development within the cordon sanitaire, as shown on the policies map, where it can be clearly demonstrated through a robust odour assessment that:

1. *The users/occupants of the proposed development will not be adversely affected by odour nuisance; and*
2. *The introduction of the proposed use will not adversely affect the continued operation of the Netheridge Sewage Treatment Works.'*

5.11 Whilst this policy does not reflect NPPF para 187 in that it does not refer to unreasonable constraints or significant adverse effects, I consider that the latest iteration of the odour assessment and detailed modelling represent a robust case that meets the test of this revised policy wording.

Gloucestershire Waste Core Strategy 2012

5.12 Core Policy WCS11 – Safeguarding Sites for Waste Management states:

'Existing and allocated sites for waste management use (including sewage treatment works) will normally be safeguarded by local planning authorities who must consult the Waste Planning Authority where there is likely to be incompatibility between land uses. Proposals that would adversely affect, or be adversely affected by, waste management uses will not be permitted unless it can be satisfactorily demonstrated by the applicant that there would be no conflict. The Waste Planning Authority (WPA) will oppose proposals for development that would prejudice the use of the site for waste management'.

5.13 Gloucester County Council consultation response states that:

'It is strongly advised that the case officer satisfies themselves that the proposed housing development will not prejudice the ability of safeguarded waste infrastructure to implement the waste hierarchy by way of carrying out their permitted activities. In addition, careful consideration must be given to a reasonable degree of future sustainable development (e.g. reconfiguration, expansion etc.) which would contribute to ensuring waste is handled efficiently and effectively to the standards set by evolving regulation and policy.' And *'There should be a strong focus on ensuring a satisfactory level of amenity/health would be achievable for any future residents of the proposal site without having to impose new/upgraded restrictions to existing waste infrastructure.'*

5.14 The detailed odour assessments carried out by Wardell Armstrong demonstrate that, at the distance between Netheridge STW and the proposed development, there is no incompatibility between land uses as no significant loss of amenity is predicted based on existing sewage treatment operations and without any need for works upgrades or restrictions. In respect of the potential for future sustainable development at the works, firstly the modelling exercise has used robust emission rates suggesting that some increase in odour emission from treatment processes could be accommodated

before adverse odour impacts would be expected within the development site. Secondly, there are existing residential properties in much closer proximity to the STW than are being proposed at the development site.

- 5.15 The nearest existing residential properties start at 100m from the south of the STW on Simms Lane which then increase in density to an extensive housing estate located between Sabre Close/Falcon Close and the Gloucester and Sharpness Canal, which continues into Quedgeley. There are also a small number of properties located in Netheridge Close which are within 125m of the STW to the east. The nearest dwellings on the proposed development site to the STW will be no less than 624m away.
- 5.16 Even if it became necessary for the future treatment capacity of the Netheridge works to increase, for example if another STW were to close, the site operator would have to adopt necessary measures such as process improvements or increased abatement, to prevent odour emissions increasing beyond the current baseline, as any adverse impacts would be much more likely to occur at the closer existing residential locations.

6 ODOUR BENCHMARK/ASSESSMENT CRITERIA

- 6.1 Unfortunately, there is no numerical statutory limit in the UK for ambient odour concentrations associated with STW's. However, guideline limits and custom-and-practice standards are used together with experience from other planning decisions.
- 6.2 Odour concentration is measured in European odour units (ou_E/m^3) using a CEN standard methodology known as Dynamic Dilution Olfactometry. The odour concentration at the detection threshold is defined to be $1\ ou_E/m^3$.
- 6.3 IAQM guidance (CD7.11) describes several odour studies which compared different odour sources which were modelled to calculate the 98th percentile (C_{98}) value of hourly average odour concentrations against reported levels of annoyance. A relationship between the C_{98} odour concentration and percentage of the population annoyed was established. These studies informed the various guidance on the determination of odour thresholds.
- 6.4 Whilst the STW is not a site controlled by the Environment Agency (EA) under the Environmental Permitting Regulations, the EA's Horizontal Guidance H4 provides useful information on assessing odour concentrations.

6.5 The EA benchmark criteria for odours are:

- 1.5 C_{98} ou_E/m^3 for a most offensive odour;
- 3.0 C_{98} ou_E/m^3 for a moderately offensive odour; and
- 6.0 C_{98} ou_E/m^3 for a less offensive odour.

6.6 The IAQM guidance advises that odours from sewage treatment works plant operating normally, i.e., non-septic conditions, would not be expected to be at the 'most offensive' end of the spectrum and can be considered on par with 'moderately offensive' odours, therefore advocating the use of 3OU as the appropriate benchmark for assessing STW sites.

6.7 Additionally, in 2012 the Chartered Institution of Water and Environmental Management (CIWEM) has issued the following statement on odour nuisance potential threshold ranges:

"CIWEM considers that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:

C_{98} , 1-hour >10 ou_E/m^3 - complaints are highly likely and odour exposure at these levels represents an actionable nuisance;

*C_{98} , 1-hour >5 ou_E/m^3 - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance;
and*

C_{98} , 1-hour <3 ou_E/m^3 - complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature."

6.8 CIWEM therefore suggest that STW odours of less than 3 ou_E are unlikely to generate complaint or significantly impact amenity at residential locations.

6.9 Other appeal decisions are relevant to this application:

- Following the appeal for Land South of Le Neubourg Way, Gillingham, Dorset, APP/N1215/W/15/3005513 (CD9.5), the Inspector wrote:

".....I conclude that the appropriate parameter to apply in this case is the 3 ou_E/m^3 contour line; a more restrictive approach would preclude from development areas which are comparable in odour terms with extensive areas of existing housing in Gillingham."

- In the case of Low Road, Cockermouth, Cumbria, APP/G0908/A/11/2151737 (CD9.4), the inspector concluded:

“I am mindful that the assessment based on a 98th percentile 1-hour average odour concentration ($C_{98,1hour}$) would not result in a totally odour free scenario, as there is a likelihood of some occasional odour issues with sites such as the WWTW. However, any period of exposure to unpleasant odour should be short lived at some 2% of a year. Moreover, there are varying degrees of odour from sewage treatment. At this WWTW, odour from the sludge holding tanks is abated by use of an odour control unit, which odour sampling has shown to have an odour removal efficiency of approximately 98%. Thus it seems that highly offensive odours are unlikely to arise during normal operation. Should odours fall within medium offensiveness, rather than low, the $C_{98,1hour}$ 3 ou_E/m³ level modelled by the appellant indicates that it would not impinge on the appeal dwellings.”

“On the evidence before me and subject to a 50m buffer, I am satisfied that the future occupiers of the development would be (sic) not be effected by odours from the WWTW to such an extent that it would create unacceptable living conditions. Furthermore, occupiers would be aware of the WWTW before deciding to move to the development.”

- 6.10 The Cockermouth ruling is particularly relevant as odorous emissions from sludge holding tanks at Netheridge STW are also abated using an Odour Control Unit; as such, a high level of odour control is maintained at the works.
- 6.11 Finally, the Cordon Sanitaire recommended by Phlorum in 2019 is based on the 3ou_E/m³ contour.

7 AGREEMENT REACHED ON 11TH AUGUST 2022

- 7.1 Following a technical review of the July 2022 odour assessment report by Phlorum, GCC requested a meeting with the applicant’s team. During the meeting, GCC advised that if the proposed development masterplan was revised to include a set-back or buffer zone on the southern and eastern boundaries of the site such that the residential development area was outside the ‘worst case’ 3 odour unit contour (3 C_{98} ou_E/m³), the Council would no longer object to the appeal on odour grounds. The buffer zone is shown on Drawing No. CSA/6036/107 (CD6.18).
- 7.2 The applicant has accepted this position and now presents a revised proposal for determination at the appeal. On this basis, a revised Development Framework Plan has been prepared as Drawing No. CSA/6036/103 Rev D (CD6.17) comprising up to 185 dwellings. However, I consider that the results of the detailed odour assessment carried out by Wardell Armstrong show that the 215 scheme is also acceptable when assessed against national and local policies.

8 CONCLUSIONS

- 8.1 Wardell Armstrong has carried out a comprehensive and robust odour assessment using a number of tools, including baseline odour observations, detailed atmospheric dispersion modelling based on agreed and recently measured odour emission rates and an analysis of historic complaint records to consider the suitability of the proposed development site for sensitive use (residential occupation) with regard to the likelihood of odour impact associated with the Netheridge Sewage Treatment Works.
- 8.2 The assessment concludes that the effects of odour from Netheridge STW on the proposed development site is negligible, which correlates to a 'not significant' effect.
- 8.3 Furthermore, an additional safeguard has been agreed with Gloucester City Council and their technical advisors which comprises an extensive stand-off or buffer zone within the development site within which no residential development will take place. This has been based on a very conservative 'worst case' scenario which could not occur in practice.
- 8.4 I have tested the assessment results against national and local planning policies, and I conclude that there are no conflicts between the proposed development and these policies in relation to odour. It is my professional opinion therefore, that there are no material reasons in relation to odour impact, why the proposed residential development on Land at Hill Farm, Hempstead Lane, Gloucester should not proceed.