# TECHNICAL NOTE

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| **Job Name:** | Hayle Sewage Treatment Works – South West Water Environmental Permitting |
| **Job No:** | 331101267-100.030101 |
| **Note No:** | ACO01 |
| **Date:** | August 2021 |
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| **Approved By:** | Peter Duncan |
| **Subject:** | **Noise and Vibration Risk Assessment** |

## 1. Introduction

1.1. Stantec (UK) has been commissioned by South West Water (SWW) to undertake a noise and vibration risk assessment to support a permit application for the Hayle Sewage Treatment Works (STW).

1.2. The application is being made due to changes to the Environment Agency (EA) interpretation of the environmental permitting exclusion for Urban Wastewater Activities (under Environmental Permitting (England and Wales) Regulations 2016 (EPR) Schedule 1, Part 2, Chapter 5, Section 5.4).

1.3. This technical note summarises the results of our review of the activities associated with the STW having regard to statutory guidance relating to noise and vibration.

## 2. EA Permitting Requirements - Noise

2.1. The Environment Agency requires that operators must consider the potential noise impact of their site. They may need to carry out noise impact assessments:

- at the permit application stage
- when applying to vary a permit
- to comply with specific permit conditions

2.2. The Environment Agency will treat noise in the same way as any other polluting emission. If noise is audible at any of the following types of locations, they may regard it as 'possibly causing an impact':

- residential properties
- schools
- hospitals
- offices
- public recreation areas
- other NSRs

- noise sensitive habitats



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Where noise is possibly causing an impact, the operator must carry out an assessment to determine:

- the level of impact
- how much work needs to be done to prevent or minimise noise pollution

2.3. Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution.

2.4. Guidance on the noise assessment process for permit applications is detailed in Noise and vibration management: environmental permits.[1]

## Guidance on Risk Assessments

2.5. Risk assessments for permitting purposes should be undertaken in accordance with the Guidance on the preparation of risk assessments[2].

## Requirements for Quantitative Noise Impact Assessments

2.6. The information requirements of the EA with regards to what must be submitted if an assessment uses computer modelling or spreadsheet calculations are detailed in guidance 'Noise impact assessments involving calculations or modelling'[3]. This requirement is not applicable in this instance as a qualitative review methodology has been selected.

## Basic Pre-Application Advice Note (v1)

2.7. A basic pre-application advice note[4] relating to Industrial Emission Directive (IED) permits for water and sewage companies has been provided by the Environment Agency.

2.8. With respect to noise, the note states that if the risk assessment indicates the operation is likely to cause noise or vibration beyond the site boundary then a noise impact assessment based on BS4142:2014+A1:2019 should be provided.

2.9. The assessment should be accompanied by a noise and vibration management plan informed by the results of the assessment.

[1] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits

[2] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

[3] https://www.gov.uk/guidance/noise-impact-assessments-involving-calculations-or-modelling

[4] Water and sewage companies IED permits: Basic pre-application advice – supporting information (v1, March 2021)

## 3. Best Applicable Techniques (BAT)

3.1. Information on BAT is detailed in the 'Commission Implementing Decision (EU) 2018/1147 of 10 August 2018'[5]. With respect to noise, section 1.4 states:

*__BAT 17__. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:*

*1. A protocol containing appropriate actions and timelines;*

*2. A protocol for conducting noise and vibration monitoring;*

*3. A protocol for response to identified noise and vibration events, e.g. complaints;*

*4. A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.*

*Applicability*

*The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated*

*__BAT 18.__ In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.*

| ***Technique*** | | ***Description*** | ***Applicability*** |
|---|---|---|---|
| *a.* | *Appropriate location of equipment and buildings* | *Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances.* | *For existing plans, the relocation of equipment and building exits or entrances may be restricted by a lack of space or excessive costs.* |
| *b.* | *Operational measures* | *This includes techniques such as:*<br>*(i) inspection and maintenance of equipment;*<br>*(ii) closing of doors and windows of enclosed areas, if possible;*<br>*(iii) equipment operation by experienced staff;*<br>*(iv) avoidance of noisy activities at night, if possible;*<br>*(v) provisions for noise control during maintenance, traffic, handling and treatment activities.* | *Generally applicable.* |
| *c.* | *Low-noise equipment* | *This may include direct drive motors, compressors, pumps and flares.* | |
| *d.* | *Noise and vibration control equipment* | *This includes techniques such as:*<br>*(i) noise reducers;*<br>*(ii) acoustic and vibrational insulation of equipment;*<br>*(iii) enclosure of noisy equipment;*<br>*(iv) soundproofing of buildings.* | *Applicability may be restricted by a lack of space (for existing plants).* |
| *e.* | *Noise attenuation* | *Noise propagation can be reduced by inserting obstacles between emitters* | *Applicable only to existing plants, as the design of new* |

[5] https://www.legislation.gov.uk/eudn/2018/1147

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| | | *and receivers (e.g. protection walls, embankments and buildings).* | *plants should make this technique unnecessary. For existing plans, the insertion of obstacles may be restricted by a lack of space.*<br>*For mechanical treatment in shredders of metal wastes, it is applicable within the constraints associated with the risk of deflagration in shredders.* |

## 4. Project Proposals

4.1. Reference should be made to Section II of the full permit application for a technical description of the site activities covered by the permit variation application. A site layout and plan of the current STW assets is included as part of the application.

## 5. Noise and Vibration Risk Assessment

5.1. A preliminary noise risk assessment has been undertaken based on information provided by SWW and the result of observations and discussions with SWW personnel during the site visit undertaken by Stantec on 13 July 2021.

5.2. In considering the potential noise impacts associated with the operations covered by the permit application, the following site-specific factors have been considered:

- The proximity and sensitivity of nearby receptors
- The existing environmental sound climate at the receptors
- The operational characteristics of the source
- The historical lack of noise complaints arising in respect of the operations carried out under the scope of the permit variation.

### Noise and Vibration Sensitive Receptors

5.3. The sensitivity of a particular receptor depends on a variety of factors, but the following table provides examples of the types of receptors likely to be considered either high, medium or low sensitivity.

Table 1: Summary of Receptor Sensitivity

| Sensitivity to Noise and Vibration | Description | Example Receptor |
|---|---|---|
| High | Receptors where people or operations are particularly sensitive to noise or vibration | Residential, including private gardens<br>Quiet outdoor areas used for recreation<br>Theatres/Auditoria/Studios<br>Schools and Nurseries during the daytime<br>Hospitals/residential care homes<br>Places of worship |
| Medium | Receptors where noise or vibration may cause some distraction or disturbance | Offices<br>Retail areas and other commercial developments<br>Bars/Cafes/Restaurants where external noise may be intrusive<br>Sports ground where quiet conditions are necessary (e.g. tennis, golf, bowls) |

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|---|---|---|
| Low | Receptors where distraction or disturbance from noise and vibration is minimal | Industrial areas<br>Sports ground with no specific requirement for quiet conditions<br>Night clubs |

5.4. For the purposes of this assessment, noise and vibration sensitive receptors are considered to be any existing occupied premises within 1km of the site which may be adversely affected by noise or vibration and has a high sensitivity. Receptors beyond this distance are unlikely to be significantly affected by noise or vibration from the STW.

5.5. In this instance the following receptors have been identified. Where appropriate, receptors have been grouped where they are within the same area. Due to the large number of receptors within 1km of the site, we have only identified those closest to the site boundary.

Table 2: Noise and Vibration Sensitive Receptors

| Receptor Reference | Receptor Description | Receptor Type | Approximate Distance/Direction from Site Boundary (m) |
|---|---|---|---|
| A | Dwellings on Chenhalls Road | Residential | 150 E |
| B | Dwellings off the A30 | Residential | 400 W |
| C | Dwellings on Treloweth Lane | Residential | 400 SW |
| D | Dwellings on Little Mill Lane | Residential | 330 S |

5.6. Due to the nature of the sources present on site, the distance between the identified receptors and the site boundary, vibration from the operations at the site is unlikely to have an impact and is considered to be low risk. Vibration is therefore not considered further.

## Existing Environmental Sound Climate

5.7. The site lies in a predominantly rural area to the south of the A30, approximately 1.8km to the SW of Hayle.

5.8. The site lies close to a number of sources of noise including the A30 and the railway line. Strategic noise mapping data provided by Defra[6] does not extend to cover the locations of the nearest noise sensitive receptors, and there are no planning applications in the immediate vicinity which include environmental sound survey data.

5.9. In the absence of detailed environmental sound surveys, the existing environmental sound climate is assumed to be relatively low so as to present a worst-case assessment.

## Operational Characteristics

5.10. The sources of noise associated with the site include:

- The movement of vehicles to and from the Imported Sludge Screen.
- The operation of plant items including the CHP engine, induced draft fans associated with odour extraction, rotating screens, compressors, waste gas burner and air-cooled radiators.

5.11. Typically, the main sources of noise would be the operation of the CHP (engine and exhaust), air-cooled radiators and waste gas burner.

[6] https://www.gov.uk/government/publications/strategic-noise-mapping-2019

5.12. All of the activities described within the permit application are existing and will continue to operate in the same manner as their established use (e.g. hours of operation and load). There are no proposed changes to activities or additional plant or equipment included as part of the permit application.

### Risk Matrix

5.13. Based on the Preliminary Noise Risk Assessment set out in above, Table 3 details a risk matrix setting out overall risk levels associated with the STW operations with regards to noise.

5.14. The combined assessment of the proposals in noise and vibration terms is that the probability of exposure and consequence are both low, with the overall risk level being low.

5.15. As a noise or vibration nuisance at sensitive receptors is not expected, nor been substantiated, and there are no changes proposed, BAT 17 as referenced in Section 3, is not considered to be applicable.

5.16. On the basis of the qualitative risk assessment carried out above and reported in Table 3, and in light of the operating history of the site, no further controls are considered necessary in respect of the activities carried out at the site.

5.17. We recommend that site management practices are included within SWW's Environmental Management Systems (EMS), which include provisions for noise control and asset maintenance; however no separate Noise Management Plan is considered necessary at this time. In the event of material changes to the local noise environment, or location or sensitivity of nearby receptors, or should substantiated complaints arise or be expected, this position should be reviewed as part of normal site management reviews and controls.

Table 3: Risk Matrix

| Noise Hazard | Receptor | Pathway | Risk Management Techniques | Probability of Exposure | Consequence | Overall Risk |
|---|---|---|---|---|---|---|
| CHP | Residential | Airborne | The CHP is containerised in a high performance acoustically treated enclosure and designed for external applications.<br>The containerised unit is located a significant distance from receptors.<br>The containerised unit is located such that surrounding structures provide further noise mitigation.<br>Programmed maintenance of the CHP is carried out to ensure that excessive noise levels are not generated. | Low - The risk management actions will prevent significant impact at nearest receptors | Low – Minor impacts | Low |
| CHP Exhaust | Residential | Airborne | Enclosure mounted exhaust silencer in place.<br>The exhaust is located a significant distance from receptors.<br>Regular checks of noise mitigation measures fitted to items of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken. | Low - The risk management actions will prevent significant impact at nearest receptors | Low – Minor impacts | Low |
| Fans on air cooled radiators | Residential | Airborne | Fans are of a low noise specification and subject to regular checks and maintenance.<br>The fans are located such that surrounding structures provide further noise mitigation.<br>The fans are located a significant distance from receptors. | Low - The risk management actions will prevent significant impact at nearest receptors | Low – Minor impacts | Low |
| Waste Gas Burner | Residential | Airborne | Waste gas burner operates only when CHPs are unavailable.<br>The waste gas burner is located a significant distance from receptors.<br>Good maintenance of plant to ensure that excessive noise levels are not generated from equipment breakdown or wear and tear (e.g. fan motor bearing failure). | Low - The risk management actions will prevent significant impact at nearest receptors | Low – Minor impacts | Low |
| Vehicular movements around site | Residential | Airborne | Vehicle movements are screened from noise sensitive receptors by existing structures. | Low - The risk management actions will prevent significant impact at nearest receptors | Low – Minor impacts | Low |