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VEOLIA

KING STREET GARSTON – PHASE 2

NOISE ASSESSMENT REPORT

NOVEMBER 2022

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KING STREET GARSTON – PHASE 2 – PHASE 2
NOISE ASSESSMENT REPORT

november 2022

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EXECUTIVE SUMMARY

The potential noise associated with the proposed development has been assessed at the nearest ESRs. The assessment is based upon noise emission data, provided by the client, for the plant and equipment for the proposed development.

The site is subject to the environmental permitting regulations, regulated by the Environment Agency (EA). As part of the development proposals, a Permit Variation application has been lodged with the EA.

The purpose of this report is to assess noise from Veolia's existing and future operations and to update on the noise assessment report completed in May 2022 assessing phase 1 of the proposals. This report includes a cumulative assessment of phase 1 and phase 2 operations at the site and supersedes the May 2022 report. The assessment has been carried out in accordance with current guidance, including BS4142 and the EA guidelines.

This report reflects the updated site layout and items of machinery that will be operational at the site.

The assessment is based on information provided by Veolia for pieces of equipment which form the proposed development and their level of use.

The character of noise from the proposed operations, will be similar to the existing environment (i.e. bland industrial sound on a background of bland industrial sound) and therefore will likely be unnoticeable.

When considering the site in context, in accordance with BS4142 and other relevant guidelines the noise generated by the proposed development will be low, and is unlikely to cause any significant impact, during the daytime and night-time periods at the existing sensitive receptors.

It is likely that there will be no noise, or barely audible or detectable noise from the proposed operations, at the receptor locations. As stated within EA permitting guidance for noise, this level means that no action is needed beyond basic appropriate measures or BAT.

1 INTRODUCTION

1.1.1 Wardell Armstrong (WA) has been commissioned by Veolia to undertake a noise assessment at the Veolia Garston Solvent Recovery Facility, King Street, Garston, Liverpool. The report will include the results of the noise assessment, modelled on the most up-to-date layout of the proposed development and up to date noise source data. This report supersedes the noise assessment report submitted in May 2022 to include phase 2 of the site proposals and is a cumulative assessment of all operations at the site.

1.1.2 The solvent recovery facility offers a service for the handling, cleansing, purification and recycling of a wide range of solvents. The development proposals will improve processing capacity and storage for the handling of an additional 28,000tpa of hazardous solvent wastes from phase 1 (two additional columns) and 28,000 tpa from phase 2 (two further additional columns).

1.1.3 The Site is located at the south-western side of the Weaver Industrial Estate, approximately 3km west of Liverpool John Lennon Airport. The Site is bounded to the north and east by other industrial uses within the Weaver Industrial Estates and immediately to the north-west by the Port of Garston. Beyond the western boundary is the River Mersey.

1.1.4 The surrounding land uses are heavy industry and/or commercial in nature, and operate 24/7. The nearest residential dwellings are located approximately 260m from the site.

1.1.5 The site is classified as a lower-tier COMAH site (Control of Major Accident Hazards) and subject to COMAH regulations, which apply to establishments that store or handle environmentally hazardous substances. Additionally the site is subject to the environmental permitting regulations, regulated by the Environment Agency and holds Hazardous Substances Consent, issued by the Hazardous Substances Authority.

1.1.6 As part of the development proposals, a permit variation application has been lodged with the EA.

1.1.7 The purpose of this report is to assess noise from Veolia's existing and future waste operations. It includes the results of a noise survey and assessment carried out in accordance with current guidance, including an assessment in accordance with BS4142 and makes recommendations for noise mitigation as appropriate.

2 METHODOLOGY

2.1 Background and Scope of Works

2.1.1 Outline planning permission for the site was granted by Liverpool City Council in June 2021 (ref: 21F/1737). As part of the planning application, Wardell Armstrong prepared a noise assessment (ref: GM11233/L001) to assess the potential impact.

2.1.2 Phase 1 of the proposed operations were assessed and reported in May 2022. This report supersedes the May 2022 report and includes a cumulative assessment of additional equipment at the site considered as phase 2 of the site proposals. The proposals include two further fractional distillation columns and an increased demand on the two cooling towers which were included in the phase 1 assessment.

2.1.3 The scope of this noise assessment includes consideration of potential noise affecting existing sensitive receptors, i.e. residential and designated ecological sites, specifically in terms of the potential impact of noise from the site, and is in accordance with current guidance and best practice.

2.2 Assessment Methodology

2.2.1 Given the nature of the proposed development the potential impacts have been assessed with reference to:

- National Planning Policy Framework, 2021 (NPPF);
- Noise Policy Statement for England, 2010 (NPSE);
- Planning Practice Guidance, 2019 (PPG);
- British Standard 8233: 2014 Guidance on Sound Insulation and noise reduction for buildings (BS8233);
- British Standard 4142: 2014 +A1:2019 Methods for Rating and assessing industrial and commercial sound; and
- Argus Ecology, Summary of Wetland Bird Survey Data
- Natural England Guidelines; and
- Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects, University of Hull, March 2013.

2.2.2 Further details on the guidance and standards used in this assessment can be found in Appendix A.

2.3 Noise Survey

2.3.1 As part of this assessment, WA has carried out a noise survey to measure the existing ambient and background sound levels at nearby noise sensitive receptors (ESRs). The noise survey is further discussed in Section 3 of this report.

2.4 Noise Modelling

2.4.1 Noise modelling software SoundPLAN version 8.2 has been used to calculate noise levels expected to be generated by the proposed operations at the ESRs. The assessment considers noise emissions from the proposed development at the receptor locations. Further details on the noise model set-up are presented in Section 5 of this report.

2.5 Solvent Recovery Process

2.5.1 The solvent recovery facility offers a service for the handling, cleansing, purification and recycling of a wide range of solvents.

2.5.2 The facility currently uses steam driven distillation columns to recover the waste product back to a high quality solvent suitable for resale to Industry, or return to the originating waste producer.

2.5.3 Solvent laundering and recovery are achieved through a distillation process, that separates the pure solvent from contaminants. Solvent distillation is described as a process in which a mixture of two or more substances is separated into its component fractions of desired purity, by the application and removal of heat. It is accomplished at the site by thin film evaporation (removal of paints, oils and resins), or by fractionation, which separates mixed solvents into clean, purified products.

2.5.4 The majority of the solvents are currently transported to site by road tankers with a small proportion delivered in drum or bulk containers which are then stored or loaded into storage tanks prior to treatment.

2.5.5 Once ready for treatment, the solvents are pumped to the distillation towers for treatment, before being pumped into storage tanks (a process which generally occurs over a few days).

2.5.6 The current site infrastructure includes:

- 2 x dual fuel gas-fired boilers capable of generating steam at 180ºC .
- 2 x cooling towers.
- 3 x distillation towers.

- 55 steel storage tanks varying in capacity from 30m³ to 100m³, with a total storage capacity of circa 2,500 m³.

2.5.7 The Garston site has a large area of land that has been identified as suitable for the development of additional waste processing and storage capacity. This area is already bunded and has appropriate drainage installed. The development would consist of:

- 4 x 30m high distillation and scrubber stack columns.
- Tank farm of 17 tanks (varying between 10m high and 19m high) with an overall capacity of 3,500m3.
- Boiler house (17.5 x 16 x 7m) containing new steam generating boilers.
- 16m high boiler stack,
- 2 x 5m high cooling towers,
- New 26m x 8m x 8m high control room, laboratory and switch room building
- Site wide fire protection system comprising of 2 No. 10m high fire water tanks
- HGV tanker loading bay

2.5.8 Through discussions with the Environmental Permitting Adviser, Project Engineer and Project Manager at Veolia, the primary sources of noise at the development were identified, and technical noise data was obtained from manufacturers. This information is presented in Appendix B.

3 BASELINE CONDITIONS

3.1.1 The existing baseline situation, including the identification of the ESRs, has been informed by a review of available mapping data and aerial photography.

3.2 Existing Sensitive Receptors

3.2.1 The following ESRs have been identified as being closest to the proposed development, other receptors may be affected by noise from the proposed operations, however, the impact at these receptors will be equal to or less than at the receptors identified in Table 1, and shown on CA12681-001.

Table 1: Existing Noise Sensitive Receptor Location

Receptor	Location	Bearing from Site	Distance to Site Boundary	Grid Reference (x, y)
ESR1	Shand Street, L19 8HX	North	260m	340111, 383917
ESR2	York Street, L19 8ER	North East	290m	340283, 383819
ESR3	Windfield Road	East	360m	340473, 383487
ESR4	Mersey Estuary Special Protection Area	South	0m	339981, 383459

3.3 The Surrounding Area

3.3.1 On the 5th and 6th May 2022, WA attended the operational site and undertook a noise survey in the local area, during the daytime, and night time periods.

3.3.2 The surrounding land uses are heavy industry and/or commercial in nature, and operate 24/7. The closest residential dwellings are located approximately 260m to the north on Shand Street, with further dwellings on York Street and Windfield Road to the east.

3.3.3 The Port of Garston is adjacent to the western boundary of the site. The sea and rail dock, is operated by the Associated British Ports, and specialises in handling a wide array of cargo, from dry bulks (such as limestone) to steel products and annually handles around 500,000 tonnes of cargo. The port also includes a rail freight terminal.

3.3.4 Prior to, and during breaks in the noise survey, observations were made by walking around the local area and detailed notes to be made of the ambient noise sources at the sensitive receptor locations.

3.3.5 The dominant sound at ESR1, ESR2, ESR3 & 4, during the daytime, and night-time surveys, was anonymous industrial noise, from unknown sources within the Weaver

Industrial Estate and Garston Docks. The sources included a steady and non-distinctive broadband industrial hum likely from fans, engines, and external plant. Other industrial sources included occasional bangs, crashes, sawing, plant, cargo ship engine, and vehicle movements.

3.3.6 The Weaver Industrial Estate contains a large number of industrial and commercial units, many of which are likely to be unrestricted in terms of working hours. The majority of the estate is hidden from view behind a large 4m high wall, so individual sources could not be identified.

3.3.7 With specific regard to the docks, a container ship was witnessed off-loading bulk limestone directly on to the dock side during the daytime. The ship was located approximately 150m from ESR1, and remained moored in the dock until around 0200 hours when it started to manoeuvre away from the dock. The ship was audible until around 0245.

3.3.8 Publicly available shipping information indicates that there is at least 1 arrival and departure movement at the dock per day. Additional noise from the docks area included the container yard, where operations were regularly audible during the daytime, and night time.

3.3.9 To the north and east of the site, at ESR2 and ESR3, noise from roof top plant located on the industrial premises of Prinovis (located off Dakota Drive), was predominantly audible during the night-time. This noise was broadband in nature, with a character similar to extraction plant. Due to its visible rooftop location, the identity of this source was readily distinctive at the receptors, however no tonal or impulsive characteristics were noted.

3.3.10 Furthermore, at ESR3 sound from Merseyside Galvanizing (located on the Weaver Industrial Estate and 160m from ESR3) was audible during the night-time. This included noise from external activities such as frequent and distinctive grinding, sawing and banging. These sounds were witnessed from the highway during the night-time, and audible at ESR3.

3.4 Details of Noise Monitoring

3.4.1 Monitoring was undertaken at a location which is representative of the sensitive receptors closest to the proposed development. The location is identified on Drawing CA12681-001.

3.4.2 During the walkover, the possibility of undertaking background noise monitoring at ESR2, ESR3 & 4 was investigated. However, no safe and suitable monitoring locations could be secured during the daytime or night-time.

3.4.3 Furthermore, it was considered the level, character, distance, and nature of the residual sound environment was similar at all the locations, and more data at a single monitoring location during the night would prove to be more robust.

3.4.4 ML1 was located approximately from 35m from ESR1, on open land off King Street. The audible noise sources are detailed above, but other sources of noise included occasional road traffic, birdsong, and aircraft departing Liverpool John Lennon Airport.

3.4.5 Attended monitoring was undertaken at this location during the daytime and night-time period. Measurements were made using a 01dB Fusion Class 1, integrating sound level meter, serial number 10711, and the calibration certificates are included in Appendix C. The microphone was mounted on a tripod with the diaphragm horizontal, and more than 3.5 metres from any other reflecting surfaces. The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No significant drift in calibration was measured during the survey.

3.4.6 A-weighted[1] L_{eqs}[2] and L_{90s}[3] were measured in accordance with the requirements of BS4142. The maximum and minimum sound pressure levels, and A-weighted L_{10s}[4] were also measured to provide additional information. The measured noise levels are set out in full in Appendix D.

3.4.7 For the purpose of this assessment, the daytime period is taken to be 0700 to 2300 hours, and the night-time period to be 2300 to 0700 hours.

3.5 Meteorological Conditions

3.5.1 The weather conditions during the noise survey were recorded. The details are shown below in Table 2.

[1] A' Weighting — An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

[2] L_{eqs} — Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

[3] L_{90} — The noise level which is exceeded for 90% of the measurement period.

[4] L_{10} — The noise level which is exceeded for 10% of the measurement period.

Table 2: Noise Survey Weather Conditions 05.05.2022 to 06.05.2022	
Description	**Weather Conditions**
Temperature	12°C to 16°C
Wind	1.0 to 3.0m/s Westerly
Cloud Cover	60% to 80%
Precipitation	Dry

3.6 Measured Noise Levels

3.6.1 The average measured noise levels have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories. The individual levels have been arithmetically averaged to give single daytime and night-time levels at the ML.

3.6.2 As detailed in paragraph 3.2, the cargo ships engines were idling at a low during the daytime and night-time, and thus audible at ML1. However, the presence of the idling engine was not discovered until the data was analysed during post-processing, and as detailed in Section 3.4, monitoring at an alternate location was not feasible.

3.6.3 Therefore the 1 hour period of monitoring during the night after the ship had departed, has also been detailed separately. Furthermore, this period could be considered 'quiet night' and therefore could be considered worst case, and will therefore provide a robust assessment of the impact.

3.6.4 The results for the monitoring location are presented in Table 3, and in Appendix D.

Table 3: Daytime and Night-time Noise Levels at Monitoring Location 1 (Figures in dB)		
Period	**$L_{Aeq, T}$**	**$L_{A90, T}$**
Daytime (1819-1919)	52	46
Night Time (2345-0345)	49	43
Night Time ex. Ship (0245 to 0345)	43	37

3.7 Existing Operations at The Site

3.7.1 During the afternoon, a visit was undertaken to the existing Veolia Garston Solvent Recovery facility. The visit was accompanied by a project engineer from Veolia, and allowed detailed observations to be made of the existing plant, how the future plant would operate and the expected character of sound.

3.7.2 Within the facility there is plant and equipment (including pipework) associated with the current distillation treatment processes, storage areas/ tanks for delivered wastes

and final treated product, buildings accommodating site staff and parking areas for the Veolia tanker fleet and staff.

3.7.3 Upon entering the site, low level sound of an industrial nature was audible across the site. At the entrance, this was predominantly from general engine/plant sound, without any distinctive tonal or impulsive characteristics from any single item of plant. Additionally, anonymous industrial sound from the adjacent industrial units was also occasionally audible.

3.7.4 It was noted that the treatment process (i.e. the distillation columns), generates a negligible amount of noise. However, plant which supports the heating/cooling requirements of the process, does generate notable sound. The main sources of sound within the existing site are the existing boiler and compressor house, and the cooling towers.

3.7.5 Additionally, there are various centrifugal pumps located around the site, which are used to transfer the solvent between each stage, including the unloading HGV tankers.

3.7.6 During the daytime, sound from the site was not audible beyond the site entrance on King Street.

3.7.7 During night-time observations near the site entrance, indicated that direct sound from the site was only just perceptible at the gate, above the residual acoustic environment which was dominated by third party industrial noise. However, beyond the entrance on King Street, noise from the site was not detectable or perceptible.

3.7.8 Due to the continuous nature of the operations on site, it was not possible to undertake the baseline noise survey with the existing plant turned off.

3.7.9 However, due to the low level of sound from the site, and the lack of distinguishable features, it was not considered to be contributing to the background or residual noise levels beyond the site boundary or at the sensitive receptor locations.

4 ASSUMPTIONS, LIMITATIONS, AND UNCERTAINTY

4.1 Introduction

4.1.1 This assessment is affected by the following assumptions, limitations, and uncertainty.

4.2 Assumptions

4.2.1 The following assumptions have been made:

- Noise Sensitive Receptors (ESRs) are positioned at a height of 1.8 m above ground level during the daytime period, and 4.0m during the night time, to represent the typical usage of a dwelling.
- The proposed boiler house, tank farm, hose exchange area, and loading bay will be constructed using insulated steel cladding, with a minimum R_w of 37dB.
- The site will be uniformly operational over a 24-hour period.
- With regard to the solvent pumps, a sound power level of 78 dB(A), has been assumed based on manufacturer supplied data which states that the pumps do not exceed 70dB(A) at 1m.
- A total of 20no solvent pumps have been included within the noise model, each operating 100% of the time.
- Each cooling tower consists of four fans (cells) and load specific operational data from the manufacturer shows that at site peak cooling demand, one unit will operate with four cells at 75% RPM and the second unit will operate with two cells at 66% RPM. Noise levels for this operation level have been provided by Veolia and the equipment supplier (shown in appendix B) and have been incorporated into the noise model. It should be noted that noise source data used for the cooling towers in the phase 1 assessment was generic data. As this data has been supplied directly by the supplier it has a higher level of accuracy, which accounts for the difference in the noise model outputs.
- Due to the orientation and proximity of the cooling towers to the receptors, it will make an insignificant difference on noise levels as to which cooling tower operates at 66% and 75%. However, in order to assess the worse-case scenario, the northern tower has been assessed at 75% as this tower is marginally closer to the closest receptors.
- While the site will operating uniformly on a day to day basis, the model is based on a conservative worst case scenario of all plant operating.
- A window open at 20% provides approximately 13 dB of noise attenuation.

- Due to the nature of the existing site and surrounding area, noise from HGV movements has not been assessed.

4.2.2 The noise source emissions and specifications are listed in Appendix B, and describe the sources which have been included in the computer noise model. Each source is situated at its exact location and ground height, for a robust assessment. The location of each noise source is shown on Drawing CA12681-002.

4.3 Limitations

4.3.1 Due to the continuous nature of the operations on site, it was not possible to undertake the noise survey with the existing plant turned off. Therefore, the background sound survey was undertaken during the daytime and night time, while the site was operational. However, due to the low level of sound from the site, and the lack of distinguishable features, it was not considered to be contributing to the background or residual noise levels beyond the site at the receptor locations.

4.3.2 During the walkover, the possibility of undertaking background noise monitoring at ESR2, ESR3 & 4 was investigated. However, no safe and suitable monitoring locations could be secured during the daytime or night-time. Furthermore, it was considered that as the level, character, distance, and nature of the residual sound environment was similar at all the locations, a single repeatable location would be robust.

4.4 Uncertainty

4.4.1 To reduce measurement uncertainty the following steps have been taken:

- The background noise measurement location was selected to be representative of the background noise level at the closest receptor to the site;
- In accordance with guidance the microphone was mounted vertically on a tripod 1.5m above the ground. The monitoring location was also more than 3.5 metres from any other reflecting surfaces;
- The background noise measurements were undertaken during suitable weather conditions, with a weather station situated on site;
- The daytime background noise monitoring was undertaken during what is considered to be the representative periods of the daytime;
- The daytime background noise monitoring was undertaken over 1 hour periods in accordance with the reference period required by BS4142;
- The night-time background noise monitoring was undertaken during what is considered to be the representative periods of the night-time;

- The night-time background noise monitoring was undertaken over 15 minute periods in accordance with the reference period required by BS4142;
- The night-time data includes engine noise from a cargo ship; however the monitoring data includes quiet periods where the monitoring data was not impacted by this source.
- The results of each measurement period are reported to the nearest 1dB; and
- Noise measurements were made using a Class 1, integrating sound level meter.

6 NOISE IMPACT ASSESSMENT

6.1 Introduction

6.1.1 This section of the report sets out the assessment of noise emissions from the site, and the potential impacts they have on the receptors.

6.2 Noise Model

6.2.1 To determine the specific sound from the proposed development at the ESRs, prediction have been undertaken using computer noise modelling software.

6.2.2 SoundPLAN version 8.2 uses geographical information to create a model of the study area on which to generate noise contours, i.e. plans demonstrating the levels of proposed industrial noise at the identified ESRs. This includes objects that affect the propagation of noise such as buildings and topography. The model uses the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors'.

6.3 Identification of Proposed Noise Sources

6.3.1 Through discussions with the Environmental Permitting Adviser, Project Engineer and Project Manager at Veolia, the primary sources of noise were identified, and technical noise data was obtained from manufacturers.

6.3.2 The proposed development includes new items of plant and operations which will generate noise. The primary sources of noise are the cooling towers, boiler house, and solvent pumps located in the hose exchange and unloading areas.

6.3.3 A 3D planning layout was provided by Veolia, which allowed the exact location and height, of each item of plant (and proposed buildings) to be identified and included within the noise model. Additionally, a 2D CAD model has been provided for importation into SoundPLAN, and also includes final finished floor levels.

6.3.4 The structures and buildings which form the development have also been included within the noise model, together with information construction information for the boiler house, distillation columns, and tank farm.

6.3.5 Appendix B details all noise sources included within the noise model, together with additional commentary with regard to the boiler house and cooling towers. The locations of the noise sources are shown on Drawing CA12681-002.

BS4142 Assessment

6.4 Identification of the Specific Sound

6.4.1 The predicted specific sound levels during the daytime and night-time periods at the ESRs are presented below in Table 4, and shown on drawings CA12681-003 and 004 respectively.

6.4.2 The sound from the site have been predicted as a free-field noise level, 1m from the façade of the identified ESRs. The daytime and night-time periods have been assessed at ground floor (1.8m) and first floor (4.0m) levels, and a difference in noise level between the two will be a result of local topography.

Table 4: Predicted Specific Sound Level at Sensitive Receptors

Receptor	Daytime, dB $L_{Aeq, 1hr}$ (Ground Floor)	Night-time, dB $L_{Aeq, 15mins}$ (First Floor)
ESR1	32	33
ESR2	31	32
ESR3	31	32

6.5 Application of Weighting for Characteristics of Specific Sound

6.5.1 BS4142 includes guidance on the application of additional weightings which include tonality, impulsivity or intermittency. Where such features are present at the assessment location characteristic corrections to the specific sound should be added to obtain a rating level.

6.5.2 During the visit to the operational site, the characteristics of the existing operations at the site, which operate similar to those proposed, were investigated. It was observed that the existing operations generate a broadband sound, as a result of various fans, plant, and pumps. No identifiable tonal or impulsive characteristics were audible around the site, and the character of noise was similar to the other industrial uses adjacent.

6.5.3 With regard to the proposed operations, these will also operate in a similar way to the existing operations, and distinctive acoustic characteristics are not expected to be audible any of the ESRs. Therefore, no corrections have been applied.

6.6 Identification of the Background Sound Level

6.6.1 Section 8 of BS4142 provides guidance on the selection of the background sound to be used in the assessment. BS4142 states that the background sound levels used for

the assessment should be representative of the period being assessed (i.e., daytime and night-time periods), and that there is no "single" background sound level.

6.6.2 Therefore, analysis of the measured sound levels is required to select the most appropriate and representative, daytime and night time background sound levels (L_{A90}).

Daytime

6.6.3 Due to the surrounding industrial sources, and built up urban environment, it was considered prior to the survey, that the greatest potential impact at the receptors would be during the night-time period, which the survey prioritised. However, measurements were undertaken during the daytime at ML1, between 1819 and 1919.

6.6.4 While this period would not be considered as typical for the daytime, rush hour traffic had subsided, but surrounding industrial sound was still audible (as detailed in Section3.3). Observations were also undertaken prior to, and after this measurement, and no significant change in ambient noise was noted. Therefore, for the purpose of the daytime assessment, the measured level of 46dB $L_{A90,1hour}$ shall be used as the representative background sound level.

Night Time

6.6.5 During the night time, measurements were undertaken at ML1, from 2345 to 0030, and 0130 to 0345 hours. However, as noted in Section 3.3, engine noise from the adjacent ships, was continuous audible until Garston Docks until 0245.

6.6.6 The mean average background sound level, during the full night time period measured is 43dB $L_{A90,15mins}$, and between 0245 and 0345 (i.e. once the ship had left) is 37dB $L_{A90,15mins}$.

6.6.7 From publicly available shipping information, it appears that ship movements at Garston Docks do commonly occur during the night-time (and daytime). However, for the purpose of the night time assessment, the lower level of 37dB $L_{A90,15mins}$ shall be used as the representative background sound level.

6.6.8 A summary of the representative background sound levels at ESRs are shown in Table 5 below.

Table 5: Representative Background Sound Levels at ESRs

Receptor	Daytime, dB $L_{A90, 1hr}$	Night-time, dB $L_{A90, 15min}$
ESR1	46	37

ESR2		
ESR3		

6.7 BS4142 Assessment

6.7.1 In accordance with BS4142, the noise rating levels from the site, as received at the ESR, have been compared with the corresponding L_{A90} background sound levels and are shown below in Table 6 below.

Table 6: BS4142 Assessment of the Noise from the Proposed Development as received at ESRs during the Daytime and Night-time (Figures in dB(A))

Description	Daytime (0700-2300)			Night-time (2300-0700)		
	ESR1	ESR2	ESR3	ESR1	ESR2	ESR3
Specific Sound Level at ESRs	32	31	31	33	32	32
Character Corrections	0			0		
Rating Level	32	31	31	33	32	32
Background Sound Level	46			37		
Excess of Rating Over Background	-14	-15	-15	-4	-5	-5

6.7.2 BS4142 states that a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context. BS4142 also states, where the rating level does not exceed the background sound level, this is an indication of a low impact, depending on the context.

6.8 BS4142 Context Assessment

6.8.1 BS4142:2014 States; “The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs”.

6.8.2 The first requirement of this statement has been determined within the noise impact assessment section above. To determine the context in which the industrial sound will reside, three factors must be considered, these are;

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor.

Absolute level of Sound

6.8.3 To determine the first context test in BS4142 it is necessary to determine whether the residual and background sound levels are high or low. Section 11 of BS4142 states;

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."

6.8.4 The rating sound levels at the ESRs are between 31 and 32dB(A) during the daytime, and 32 and 33dB(A) during the night-time. Background sound levels at the ESRs are 46dB L_{A90} during the daytime, and 37dB L_{A90} during the night-time. The rating levels are low, however the background sound levels are considered to be moderate. Thus, in terms of the absolute level of sound, the difference presented in Table 8 provides a good indication of the potential noise impact at the ESRs.

Character and Level of Residual Sound Compared with the Specific Sound

6.8.5 The sensitive receptors and the development site are located within a dense urban / industrial area. Existing sources audible at the ESR, include a steady and non-distinctive broadband hum, together with occasional bangs, crashes, sawing, plant and engine noise, and vehicle movements from industrial sources.

6.8.6 The sources which surround the ESR are all long standing industrial related uses, and the character and level of the specific sound from proposed operations and will be similar (i.e. steady broadband industrial noise) and not out of character for the area.

6.8.7 Therefore, when the level and character of the noise from the development are compared to the level and character of existing noise sources in the vicinity, the significance of the impact from the proposed development is reduced.

6.8.8 This is an indication that the predicted impacts in Table 6, can be reduced as the character and level of the specific and residual sounds are similar, and the proposed operations are likely to be inaudible and not noticeable.

Sensitivity of Receptor

6.8.9 With regard to pertinent factors to be taken into consideration, Section 11 of BS4142 states;

"The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal design and/or outdoor acoustic conditions, such as:

i. Façade insulate treatment;

ii. Ventilation and/or cooling that will reduce the need to have windows open as to provide rapid or purge ventilation; and

iii. Acoustic screening."

6.8.10 The receptors are all residential properties, located in a dense urban / industrial environment. All of the predictions have assumed that none of the properties have any additional acoustic measures incorporated such as façade insulation and fences.

6.8.11 The glazing and ventilation specifications of the ESR is not known. However, to be robust it is assumed that they do not have the benefit of alternative ventilation methods. Therefore, they are likely relying on open windows to achieve sufficient background ventilation.

6.8.12 The existing façade mitigation will provide some attenuation of the noise from the proposed development. It is generally agreed that a partially open window provides approximately 13 dB of attenuation, this would therefore further reduce the impact at all receptors night-time periods when considering internal living areas.

6.8.13 In addition, the identified ESRs are located in an established industrial area, with operations including plant, fans, bangs, crashes, and cargo ships all audible during the night-time.

6.8.14 The predicted noise from the proposed operations is not very high, and is unlikely to be audible or noticeable at the ESRs. Therefore, they are likely to be less sensitive to the proposed industrial noise.

6.8.15 Additionally, the specific noise levels generated by the proposed development is below the ambient noise level during the quiet night period, and the internal and external sound levels are likely to remain unchanged.

6.8.16 This is an indication that the predicted impacts in Table 6, can be reduced as there is a lower likelihood of the proposed operations causing an adverse impact to the receptors.

6.9 Summary of Assessment

6.9.1 The results of the BS4142 assessment indicates that sound from operations at the site will be below the background sound level at the ESRs during the daytime and night-time.

6.9.2 When considering the context, in accordance with BS4142, noise from proposed operations will result in a **low impact** at the ESRs.

6.9.3 It is likely that there will be no noise, or barely audible or detectable noise from the proposed operations, at the receptor locations.

6.9.4 As stated within EA permitting guidance for noise, this level means that no action is needed beyond basic appropriate measures or BAT.

6.10 Uncertainty of Assessment

6.10.1 As stated with the EA permitting guidance, the uncertainty of the measurements and predictions must be identified and minimised. It also stated that uncertainties should be proportionate to the risk that the site presents, and the likely scale of the uncertainty.

6.10.2 With regard to the sources of noise, manufacturer data has been used within the model to predict the levels at the ESRs. The model uses the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors' which accounts for downwind propagation.

6.10.3 Furthermore, care has been when setting up the noise model to ensure its accuracy, and that represents the proposed site layout and the local environment local area (i.e. topography and existing buildings).

6.10.4 The dominant noise source at the site is likely to be the cooling towers, however research has been undertaken regarding the measurement methods used to obtain the sound power level (ATC-128) and to ensure the data supplied is robust.

6.10.5 The assessment also considers a worst case scenario will all equipment running 100% of the time. The noise from the proposed operations will be steady, however there could be small day to day fluctuations which could result in a lower level of sound at

the receptors. External factors such as the ambient temperature, could reduce the load and subsequent noise from the cooling towers.

6.10.6 A reasonable and professional judgement has been made when undertaken the assessment, and while there could be a small margin of uncertainty within the predictions is unlikely to increase the overall impact level at the ESRs.

6.11 Ecological Assessment

6.11.1 The noise modelling has shown that the predicted noise levels at ESR4 is 35dB(A). With no additional mitigation in place, noise levels from the proposed development will be below all of the noise relevant noise guideline levels at the SPA. i.e. lower than 55dB and no more than 3dB above background noise levels.

6.11.2 In particular the noise levels fall far below the lower guideline noise of 60dB related to the ringed plover. The proposed development would be unlikely to increase existing noise levels noticeably above the noise guide levels.

6.11.3 It is also considered that the noise associated with the proposed development will have a similar character to the existing noise in the area and due to the relatively low noise levels associated with the development, it is unlikely it will be discernible at the SPA.

7 BEST AVAILBLE TECHNIQUE (BAT)

7.1.1 “Best Available Techniques" (BAT) means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole.

7.1.2 Veolia recognise the potential for site operations at King Street to generate noise and are committed to operating the facility in accordance with current best practice. By implementing BAT to control and mitigate the noise generated by the proposed operations, it is considered that noise can be adequately controlled.

7.1.3 Further detail on managing sites to minimise noise is given in the Environment Agency’s guidance on Noise and Vibration management in relation to environmental permits. The guidance shows that control of noise should follow the hierarchy below:

- Prevent the generation of noise at source by good design, site layout and maintenance.
- Minimise or contain noise at source by following good operational techniques and management practice.
- Use effective silencers, physical barriers or enclosures.
- Use sympathetic timing to control unavoidably noisy operations.
- Where possible, increase the distance between the source and receptors.

7.2 Prevent Noise at Source

7.2.1 Noise has been eliminated as far as possible by good design (i.e. locating the cooling towers on the screened side of the boiler house) and site layout.

7.3 Minimise Noise at Source

7.3.1 The EA guidance sets out a number of management and maintenance measures that can be used to prevent excessive noise. Table 8 sets out how the site will comply with the measures that can be used to prevent excessive noise across the whole site.

Table 8: Management Measures to Minimise Noise

Recommended Action	Action to be Taken
Good Housekeeping	
Switch off plant that is not in use	Due to the nature of the proposed operations, most site plant will be required to operate 24/7. However, plant that is not immediately required for use will be

Table 8: Management Measures to Minimise Noise	
Recommended Action	**Action to be Taken**
	switched off. Deliveries will be managed efficiently to minimise idling of vehicles.
Restrict working hours	Deliveries will only be made during the working day. Maintenance that may cause a noise will be carried out during the working day as a far as possible.
Promote considerate behaviour	Staff on site will report any changes in the noise environment / incidents involving noise, or any other perceived noise issues management so they can be quickly investigated
Avoid turbulence, pumps etc	The plant will be monitored by the system and automatically adjusted to allow the smooth flow of solvent around the plant.
Maintenance	
Ensure fans are in balance	Fans and similar equipment will be included in the regular preventative maintenance programme to ensure that they are inspected and maintained as needed.
Prevent ducts rattling	Pipework will be included in the regular maintenance programme to ensure all pipes are seated properly and that insulation etc is in good repair.
Ensure acoustic mitigation remains fit for purpose	The acoustic insulation around the boilers will be inspected regularly and in the event of damage or corrosion that could prevent their proper operation repairs will be scheduled as soon as possible.
Maintain other plant and vehicles	Plant and vehicles will be serviced in accordance with the manufacturer's recommendations.
Maintain site roads	The site entrance road will be properly maintained to prevent noise caused by vehicles passing over potholes or manholes.

7.4 Silencers, Noise Barriers, and Enclosures

7.4.1 Further mitigation measures, including the use of barriers are not proposed at the present time.

7.5 Sympathetic Timing of Noisy Operations

7.5.1 The solvent recovery process is a continual operation, which operates 24 hours a day. due to the nature of the operations, the associated plant also operates continuously, but at a steady level.

7.5.2 During the daytime, the site operates with a full team of staff, however during the night-time only 2 or 3 members of staff are present on site.

7.5.3 However, vehicle movements are restricted to the working day, with no deliveries taking place during the night-time period. Where possible non-essential maintenance activities will also be carried out during the working day to avoid disturbance.

7.5.4 Notwithstanding the above, it is recommended that background noise monitoring is undertaken, during a future shut down period. This will allow a detailed and accurate understanding of the residual sound environment to be understood. In turn, this will aid any potential issues which could occur, and could be considered as good housekeeping.

7.6 Increase the distance between the noise source and the receptor

7.6.1 Due to the limited space at the site, further design changes are very limited. The human receptors are located over 260m away, with little to no line of sight to the proposed development (other than the 30m high distillation columns).

8 RESIDUAL IMPACTS

8.1.1 When considering likely significant residual impacts, this assessment has considered the intra-cumulative impacts (i.e. those that occur as a result of the proposed operations in isolation) and inter-cumulative impacts (i.e. those that occur as a result of the proposed operations in combination with the existing operations and ambient noise sources.

8.1.2 The results of the assessment of industrial noise are detailed in Section 6 of this report, and include the noise impact for each ESR in accordance BS4142, EA noise guidance & relevant ecological guidance. The results indicate that there will be a **low impact** at the receptors, when considering the potential cumulative effect within the locality of the proposed development.

9 CONCLUSIONS

9.1.1 The potential noise associated with the proposed development has been assessed at the nearest ESRs. The assessment is based upon noise emission data, provided by the client, for the plant and equipment for the proposed development.

9.1.2 The surrounding land uses are heavy industry and/or commercial in nature and include The Port of Garston which operates bulk cargo ships. Noise from the adjacent industrial uses was dominant at the receptor locations during the daytime and night time.

9.1.3 The closest residential dwellings are located around 260m to the north on Shand Street, with further dwellings on York Street and Windfield Road to the east. There is an Special Protection Area directly to the south of the site.

9.1.4 The site is subject to the environmental permitting regulations, regulated by the Environment Agency (EA). As part of the development proposals, a Permit Variation application has been lodged with the EA.

9.1.5 The purpose of this report is to assess noise from Veolia's existing and future operations. It includes the results of a noise survey and assessment carried out in accordance with current guidance, including an assessment in accordance with BS4142 and makes recommendations for noise mitigation as appropriate.

9.1.6 The dominant noise from the development, will be the cooling towers. The predicted sound levels at the receptors will be broadband in character, with no tonal or impulsive components. Furthermore, it is unlikely to be readily distinctive against the residual environment.

9.1.7 For the purpose of this assessment, the noise from the site has been assumed to be continuous.

9.1.8 The results of the BS4142 assessment indicates that sound from operations at the site will be below the background sound level at the ESRs during the daytime and night-time.

9.1.9 When considering the context, BAT, and uncertainty, noise from proposed operations, will result in a **low impact** at the ESRs.

9.1.10 It should be noted that noise source data used for the cooling towers in the phase 1 assessment was generic data. As this data has been supplied directly by the supplier it

has a higher level of accuracy, which accounts for the difference in the noise model outputs.

9.1.11 It is likely that there will be no noise, or barely audible or detectable noise from the proposed operations, at the receptor locations. As stated within EA permitting guidance for noise, this level means that no action is needed beyond basic appropriate measures or BAT.

APPENDICES

Appendix A

Legislation, Policy and Guidance

Policy, Standards and Guidance

Appendix A

National Planning Policy Framework

In February 2021 the 'National Planning Policy Framework' (NPPF) was amended as the current planning policy guidance within England.

Paragraph 185 of the NPPF states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on heath, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impact that could arise from the development. In doing so they should:

a. Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impact on health and the quality of life;

b. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'…

Paragraph 187 of the NPPF states:

'Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). 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.'

Noise Policy Statement for England

With regard to 'significant adverse impacts on health and the quality of life' the NPPF refers to the 'Noise Policy Statement for England' (NPSE).

The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on

established concepts from toxicology that are applied to noise impacts by WHO.

Three levels are defined as follows:

'NOEL – No Observed Effect Level

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur'.

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance – Noise

The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 1 summarises the noise exposure hierarchy.

Table 1 - National Planning Practice Guidance noise exposure hierarchy			
Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

> "Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other

environmental dimensions of proposed development"

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise

ProPG Planning and Noise provides professional practice guidance in relation to new residential development exposed to noise from transport sources. It provides practitioners with a recommended approach to the management of noise within the planning system in England.

The guidance reflects the Government's overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisors, on achieving good acoustic design in and around new residential developments.

British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings

British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;

- 35 dB $L_{Aeq\ (16\ hour)}$ during the day time in noise sensitive rooms
- 30 dB $L_{Aeq\ (8\ hour)}$ during the night time in bedrooms
- 45 dB $L_{Amax,F}$ during the night time in bedrooms
- 50 dB $L_{Aeq\ (16\ hour)}$ desirable external noise levels for amenity space such as gardens and patios
- 55 dB $L_{Aeq\ (16\ hour)}$ upper guideline value which would be acceptable in noisier environments.

In addition, for internal noise levels it states;

> "Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

Furthermore, with regard to external noise, the Standard states;

> "However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a

compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".

British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound (BS4142):

BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:

1) Investigating complaints;

2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) Assessing sound at proposed new dwellings or premises used for residential purposes.

The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

BS4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with industrial noise. The 'specific noise' sources, of the existing industrial

premises that have been observed are detailed in Section 3 of this report.

BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 of this report provides details of the background noise survey undertaken.

Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and,

- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Argus Ecology – Summary of Wetland Bird Survey Data

The ringed plover are very tolerant of moderate and high level disturbance. Birds that are closer than 50m to works should however, be given consideration when commencing works and efforts should be made to avoid high level disturbance at such time, if possible, especially if it includes workers on the mudflat/fronting intertidal zone.

Ringer plover would appear not to be very sensitive to noise stimuli and to habituate rapidly, especially in conjunction with visual stimuli. A noise level of up to 75dB is considered acceptable at the bird, but with caution given above 60dB levels (65dB in a highly disturbed area). They will forage extremely close to plant (<50m), and a source noise threshold of 107-112dB can be tolerated but with caution to levels above 93-98dB.

Natural England Guidelines

Natural England guidelines state that birds begin to react at a noise level above 55dB(A). They also state that as a general rule if the noise source is no more than 3dB higher than background noise levels, then Natural England accepts that it is unlikely to be significant.

Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects.

These guidelines state that

> *'Low level noise is classed as that which is unlikely to cause response in birds using a fronting intertidal area. As such noises of less than 55dB at the bird are included in this category. These effects are likely to be masked by background inputs in all the least disturbed areas and thus would not disturb the birds close by. Noise between 55-72dB in some highly disturbed areas e.g. industrial or urban areas and adjacent to roads, may feature a low level of disturbance provided the noise level was regular as birds will to often habituate to a contact noise level.*

Appendix B

Proposed Noise Sources

Appendix B
Sources of Noise

The table below, details all noise sources included within the noise model, together with the location, height, and sound power level used in the model.

Pump Number	Name	Location	Qty	Height from ground/size (m)	Sound Power Level (dB)	Data Source
P201/202/203	Column feed pump	Hose exchange	3	0.5	78	Data supplied by pump supplier indicates a maximum sound pressure level is equal to or lower than 70 dB(A), at 1m for all pumps. **Sound power calculated from sound pressure with following parameters:** Half sphere: point source radiating in half space (on ground) Measurement distance D [m] = 1.0 Lw = Lp + 10 log(A) = Lp + 8.0 dB **Octave band data obtained from sound plan source:** Electric water pump BS 5228-1:2009, Table C11
P205/206	Loading pump	Hose exchange	1	0.5	78	
P207	Residues pump	Hose exchange	1	0.5	78	
P208/209	Boiler fuel pump	Hose exchange	1	0.5	78	
P210	Acetic Acid Pump	Hose exchange	1	0.5	78	
P211	CSW xfer Pump	Hose exchange	1	0.5	78	
P301/302	Loading pump	Tanker Bay	2	0.5	78	
P701	Reboiler pump	Process Area	2	0.5	78	
P702A/B	Reflux pump	Distillation Skid	2	10.5	78	
P703	Product pump	Distillation Skid	2	0.5	78	
P704	Vacuum Pump	Distillation Skid	2	18.5	78	
P xxx	Scrubber pump	Adj to H/E	1	0.5	78	
P xxx	Scrubber fan	Adj to H/E	1	0.5	80	Archive data used, based on nature of the plant (low speed) observations of existing fan at site, inc level and character.
Boiler 002/003	Gas Steam Boiler	Inside Boiler house	2	5 x 2 x 2	104.7	Manufacturer data of 85dB at 1m, inc acoustic insulation. **Sound power calculated from sound pressure with following parameters:** Box shaped machine radiating in half space (on ground) Measurement distance D [m] = 1.0 Machine size (W*L*H) = 5.0*2.0*2.0 [m*m*m] Lw = Lp + 10 log(A) = Lp + 19.7 dB **Octave band data obtained from sound plan source:** Power Station (Boiler & Coal Mill Room)
Cooling Tower	Cooling tower	Adj to Boiler house	2	7.4 x 7.4 x 5.6	105(95)	Manufacturer data, see comment below

Appendix B
Sources of Noise

The table below, details all noise sources included within the noise model, together with the location, height, and sound power level used in the model.

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P205/206	Loading pump	Hose exchange	1	0.5	78	
P207	Residues pump	Hose exchange	1	0.5	78	
P208/209	Boiler fuel pump	Hose exchange	1	0.5	78	
P210	Acetic Acid Pump	Hose exchange	1	0.5	78	
P211	CSW xfer Pump	Hose exchange	1	0.5	78	
P301/302	Loading pump	Tanker Bay	2	0.5	78	
P701	Reboiler pump	Process Area	2	0.5	78	
P702A/B	Reflux pump	Distillation Skid	2	10.5	78	
P703	Product pump	Distillation Skid	2	0.5	78	
P704	Vacuum Pump	Distillation Skid	2	18.5	78	
P xxx	Scrubber pump	Adj to H/E	1	0.5	78	
P xxx	Scrubber fan	Adj to H/E	1	0.5	80	Archive data used, based on nature of the plant (low speed) observations of existing fan at site, inc level and character.
Boiler 002/003	Gas Steam Boiler	Inside Boiler house	2	5 x 2 x 2	104.7	Manufacturer data of 85dB at 1m, inc acoustic insulation. **Sound power calculated from sound pressure with following parameters:** Box shaped machine radiating in half space (on ground) Measurement distance D [m] = 1.0 Machine size (W*L*H) = 5.0*2.0*2.0 [m*m*m] Lw = Lp + 10 log(A) = Lp + 19.7 dB **Octave band data obtained from sound plan source:** Power Station (Boiler & Coal Mill Room)
Cooling Tower	Cooling tower	Adj to Boiler house	2	7.4 x 7.4 x 5.6	105(95)	Manufacturer data, see comment below

Appendix B
Sources of Noise

Cooling Towers

The development will feature two cooling towers which measure 7.3x7.3x5.6m (L*W*H). Each of the induced draft cooling towers, features 4 large propeller fans located at the top of the unit, drawing in air from the side and discharging upwards. The primary noise is from the fan, however other quieter sources can include splashing and spraying water (as part of the condensing process), motor and gearbox noise.

Noise data for the cooling towers has been provided by the manufacturer (Evapco), and has been measured using the in accordance with Acceptance Test Code 128 Measurement of Sound from Water Cooling Towers (ATC-128), an industry recognised standard set by the American based Cooling Technology Institute (CTI).

The noise data sheet details the noise levels from the two 10MW cooling towers, and includes noise data was measured at 1.5m and 15m, for each side face and the top. Additionally, the data sheet includes the octave band sound power level, which has been derived in accordance with ATC-128, and includes all fans operating at 100%.

The maximum cooling load if all 4 distillation skids are operational would involve one cooling tower operating at 75% RPM and the other at 66% RPM. Data sheets have been provided by Evapco. The load specific operational data from the manufacturer shows that at peak site cooling demand one unit will operate with four cells at 75% RPM and the second unit will operate with two cells at 66% RPM.

Noise data sheets have been provided by Evapco showing the octave band sound power level at 75% and 66% as shown below. These levels have been used within the noise model:

Appendix B
Sources of Noise

MODEL: AT 424-4N24
MOTOR: 30 kW (40 HP)
MOTORS: 4
SPEED: 75.0%

MULTI-CELL DATA

	SOUND PRESSURE LEVEL										CTI SOUND POWER LEVEL
	End		Mtr. Side		End		Opp. Mtr. Side		Top		
BAND	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	
63 HZ	70	68	70	69	70	68	70	69	79	74	101
125 HZ	78	71	78	71	78	71	78	71	81	74	101
250 HZ	78	71	78	71	78	71	78	71	82	76	102
500 HZ	76	67	77	66	76	67	77	66	78	72	97
1 kHZ	74	65	74	66	74	65	74	66	75	67	95
2 kHZ	72	63	74	64	72	63	74	64	73	65	92
4 kHZ	75	62	76	63	75	62	76	63	75	65	91
8 kHZ	77	60	78	63	77	60	78	63	72	63	90
dBA	82	71	83	72	82	71	83	72	82	75	101

REMARKS:
1. Sound Pressure Levels are according to CTI Standard ATC-128.
2. Sound Power Levels are calculated according to the Small Units Section 8.
3. Sound from free-field conditions over a reflecting plane with +/- 2 db(A) tolerance.
4. Noise levels can increase with variable frequency drives depending on the drive manufacturer and the drive configuration.
5. Complete unit sound data with all fans operating.

MODEL: AT 424-4N24
MOTOR: 30 kW (40 HP)
MOTORS: 2
SPEED: 66.0%

2 Cell operation DATA

	SOUND PRESSURE LEVEL										CTI SOUND POWER LEVEL
	End		Mtr. Side		End		Opp. Mtr. Side		Top		
BAND	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	1.0 m (3.3 ft)	10. m (32.8 ft)	
63 HZ	65	63	67	64	65	63	67	64	75	68	95
125 HZ	73	65	74	66	73	65	74	66	76	69	96
250 HZ	73	65	74	66	73	65	74	66	77	71	96
500 HZ	73	62	75	63	73	62	75	63	74	66	92
1 kHZ	72	63	73	64	72	63	73	64	71	63	92
2 kHZ	70	59	72	63	70	59	72	63	69	62	89
4 kHZ	73	59	74	61	73	59	74	61	71	61	88
8 kHZ	75	57	76	61	75	57	76	61	69	60	87
dBA	80	68	81	70	80	68	81	70	78	70	97

REMARKS:
1. Sound Pressure Levels are according to CTI Standard ATC-128.
2. Sound Power Levels are calculated according to the Small Units Section 8.
3. Sound from free-field conditions over a reflecting plane with +/- 2 db(A) tolerance.
4. Noise levels can increase with variable frequency drives depending on the drive manufacturer and the drive configuration.
5. Complete unit sound data with all fans operating.

Appendix B
Sources of Noise

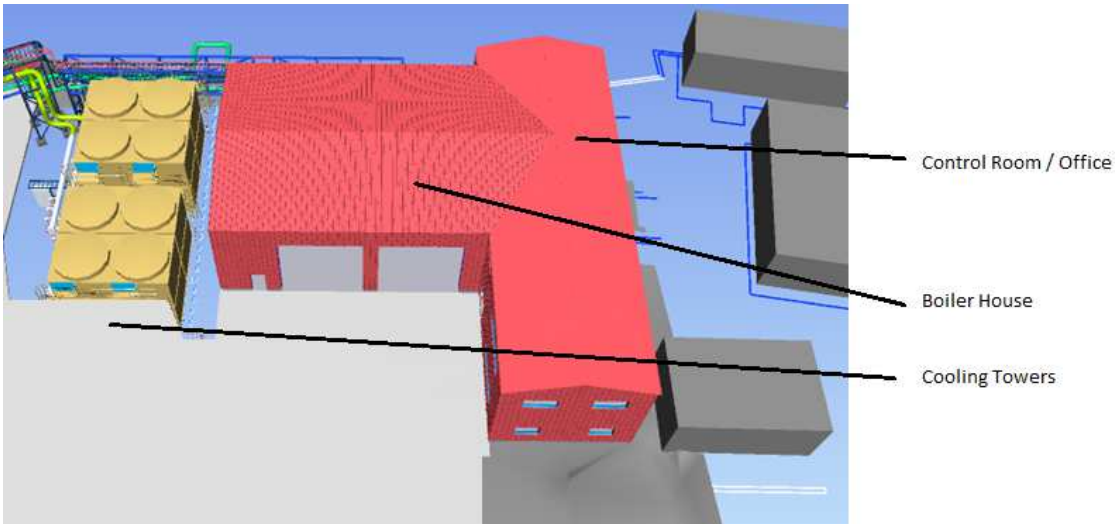


Fig 1. Cooling Towers and Boiler House.

Boiler House

The boiler house will be constructed using corrugated steel cladding and house 2 steam generating boilers. Manufacturer information indicates these will produce 85dB(A) at a distance of 1m, when using acoustic insulation. The boiler house will also feature pumps used to feed the boiler with water will also be similar to that currently used. However, given the size and noise level of the boilers, the contribution of these from the pumps will be negligible, and have not been included in the noise model.

Distillation columns

The skids associated with the distillation columns contain reflux pumps, product pumps and liquid ring vacuum pumps. They are at various height levels within the skids from 18.5m to ground floor. Additionally, the skid also features a pump and fan at ground floor height, associated with the scrubber unit (not shown in picture).

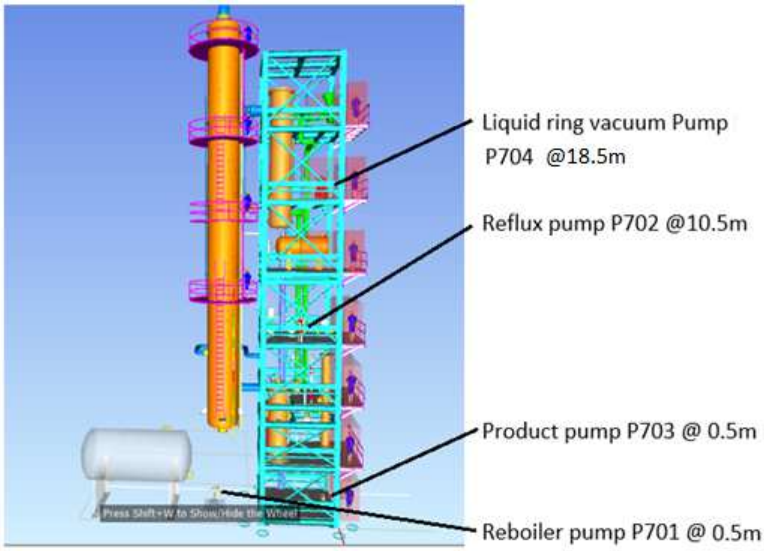


Fig 1. Distillation column and pump locations.

Hose exchange and Loading Bay

Appendix B
Sources of Noise

The hose exchange area is located between the tank farm and skids, and will be located 2m below the ground level of the skids. The walls and floor will be constructed using, with partially open sides and corrugated sheet profile roof. The area will feature 10 pumps, used for transferring the solvent between the tank farm and distillation process.

Boiler fuel feed pumps	P208 P209
Column feed pumps	P201, P202, P203
Tanker loading pumps	P205 P206
Residue loading pumps	P207
Acetic acid pump	P210
CSW transfer pump	P211

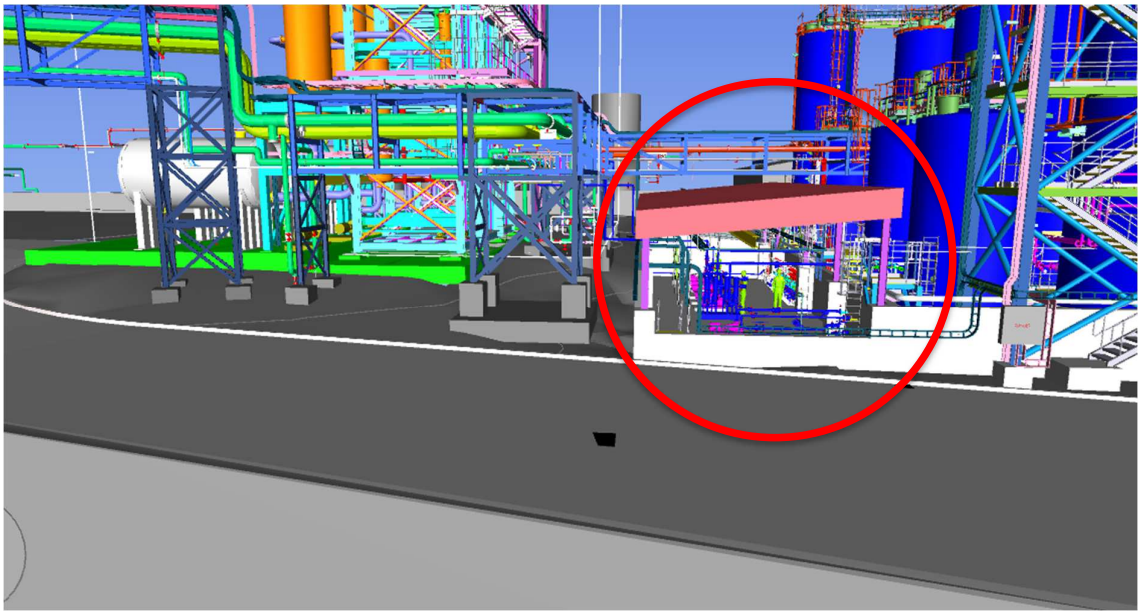


Fig 2. Hose exchange area, side view from west.

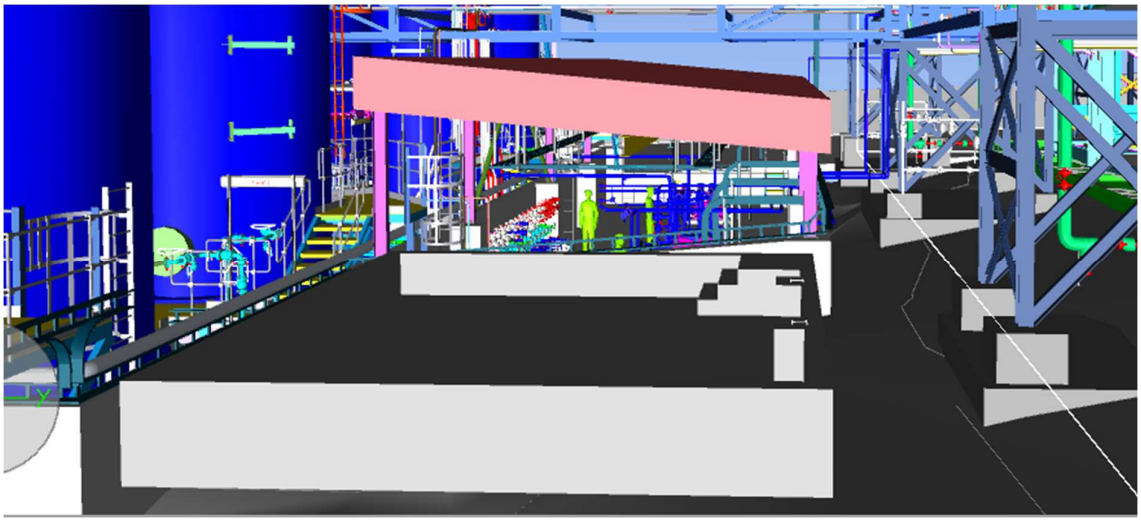


Fig 2. Hose exchange area, side view from east.

Appendix B
Sources of Noise

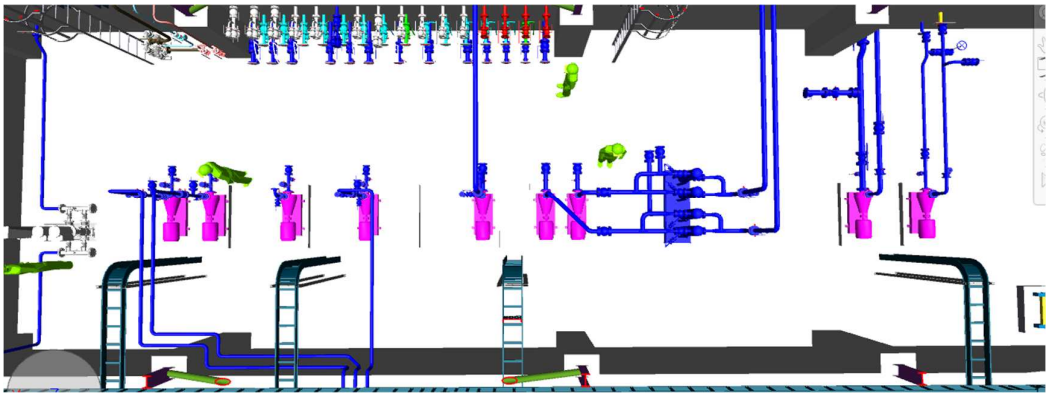
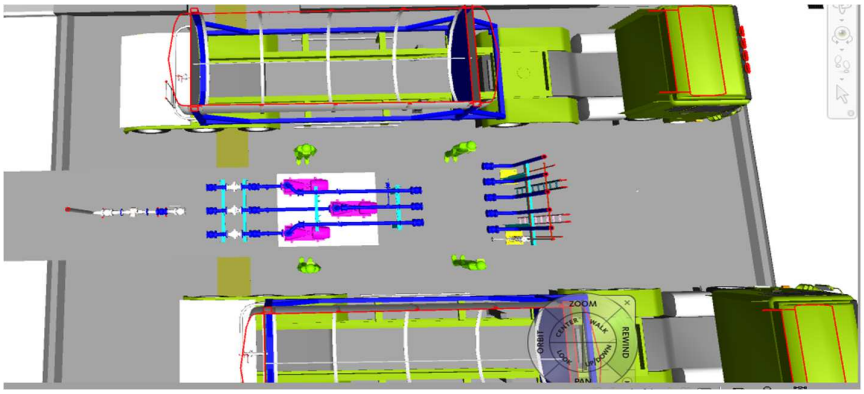


Fig 3. Hose exchange area, top view.

The loading bay, also features an open sided roof, and features 3 pumps used of unloading HGV tankers; P301/302/303.



Appendix C

Noise Monitoring Results

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES

Claire Lomax [x] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

acoustic calibration laboratory
The University of Salford, Salford, Greater Manchester, M5 4WT, UK
http://www.acoustics.salford.ac.uk
t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk

UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 05130/2 Date of Issue: 1st March 2021

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Wardell Armstrong LLP 41-50 Futura Park Aspinall Way Middlebrook Bolton BL6 6SU
FOR THE ATTENTION OF:	Peter Kowalczuk
DATE RECEIVED:	19 February 2021
PERIODIC TEST DATE:	26 February 2021
LOCATION OF CALIBRATION:	Acoustic Calibration Laboratory, Newton G31, University of Salford
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details-

Manufacturer	01dB	
Model	FUSION	
Serial number	10711	
Class	1	
Hardware version	LIS006E	Application FW: 2.40, Metrology FW: 2.12

Associated Items:-

Type	Manufacturer	Model	Serial Number
Microphone	GRAS	40CE	226341
Preamplifier	01dB	PRE 22	10735

Test Engineer (initial): GP Name: Gary Phillips

Results in this certificate relate only to instruments tested.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate Number: 05130/2 Date of Issue: 1st March 2021

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: DOC1131 June 2014 G – FUSION User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were provided by the manufacturer.

The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB, and as this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 103.225 kPa ± 0.014 kPa; air temperature 23.4 °C ± 0.3 °C; relative humidity 37.0 % ± 2.6 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 94.1 dB (C). The instrument was then adjusted to indicate 93.9 dB (C). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit with the small windscreen, supplied RAL135-5M microphone extension cable connected to the external input and the following instrument settings; Microphone Input: External, Microphone Type: 40CE, Reference direction: 90˚, High-pass filter: 10Hz, Nose cone: Yes.

With the microphone installed the level of self-generated noise on the most-sensitive level range was:

A: 18.2 dB*

* Under-range indicated on instrument display

With the microphone replaced by an electrical input device with a similar capacitance to that of the supplied microphone, the levels of self-generated noise on the most-sensitive level range were:

A: 13.4 dB*†
B: 12.7 dB*
C: 13.8 dB*†
Z: 21.1 dB*†

* Under-range indicated on instrument display

† Indicates that the measured level exceeds the typical level of self-generated noise stated in the manufacturer's instruction manual. Note: The manufacturer's instruction manual did not specify the maximum expected level of self-generated noise.

The environmental conditions in the laboratory at the end of the test were:
Static pressure 103.220 kPa ± 0.014 kPa; air temperature 22.7 °C ± 0.3 °C; relative humidity 35.3 % ± 2.6 %.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate Number: 05130/2 Date of Issue: 1st March 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz, 1 kHz and 8 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

-----END OF CERTIFICATE-----

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Appendix D

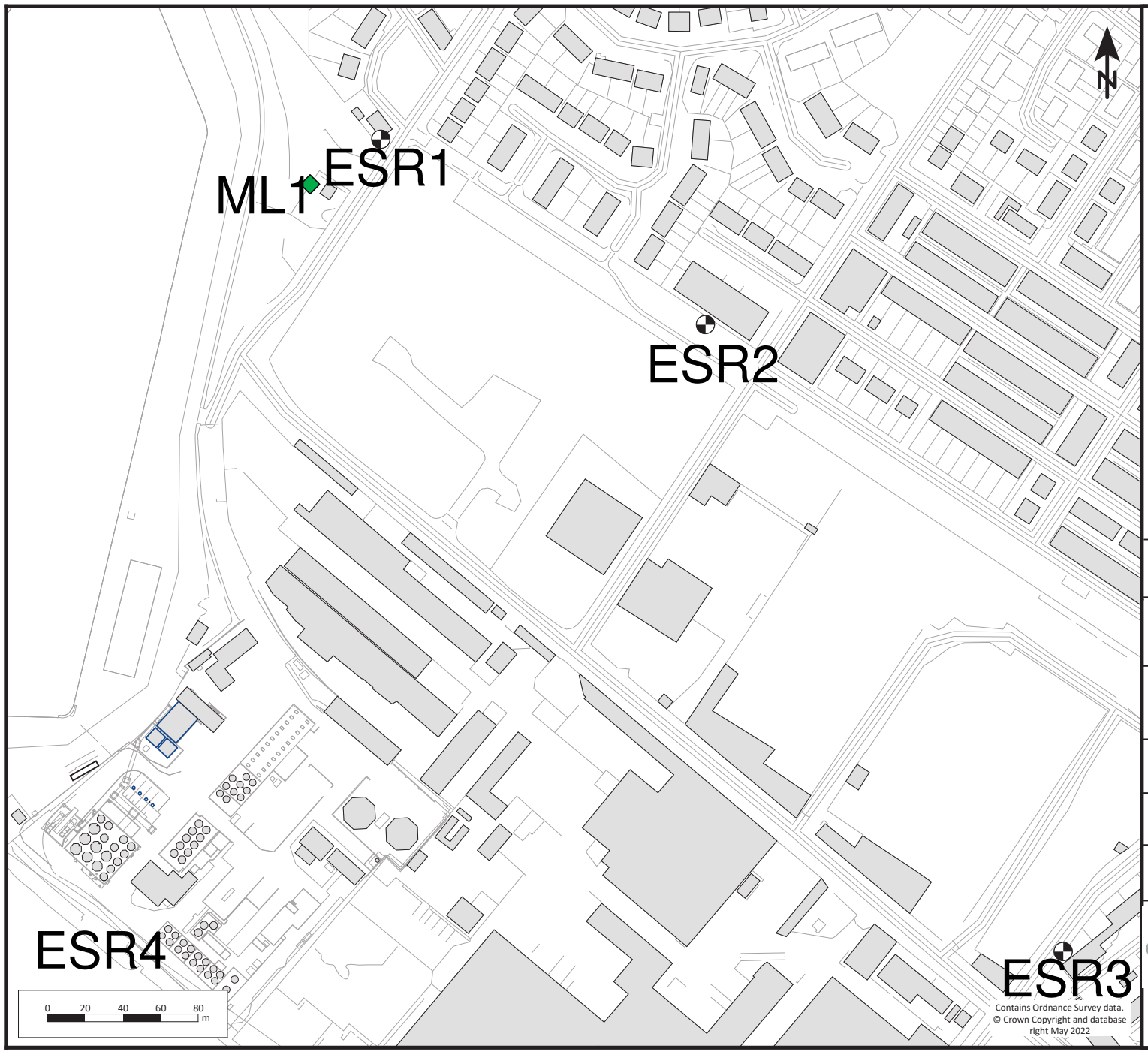
Sound Level Meter Calibration

Appendix D

Noise Monitoring Results

ML1 – Off King Street Representative of ESR1					
Period Start	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**
Daytime (1hour)					
05/05/2022 18:19	52.2	42.2	80.0	46.4	53.4
Night-Time (15min)					
05/05/2022 23:45	46.0	44.1	61.2	45.0	46.2
05/06/2022 00:00	46.6	44.8	59.7	45.7	46.7
05/06/2022 00:15	46.2	43.0	52.8	45.5	46.9
05/06/2022 00:30	46.7	44.9	69.2	45.6	46.5
05/06/2022 01:30	43.8	40.7	66.2	41.8	43.2
05/06/2022 01:45	44.8	40.9	64.8	41.9	45.6
05/06/2022 02:00	52.4	43.6	58.9	44.7	55.4
05/06/2022 02:15	55.9	50.5	64.9	53.3	57.6
05/06/2022 02:30	52.2	47.1	58.6	50.3	53.5
05/06/2022 02:45	42.1	35.3	53.3	36.5	46.2
05/06/2022 03:00	37.9	35.4	43.1	36.7	38.6
05/06/2022 03:15	42.3	35.9	59.2	37.4	43.9
05/06/2022 03:30	47.8	36.6	68.6	38.8	50.5

DRAWINGS



Key

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- Monitoring Location
- Elevation line
- Buildings
- Industrial Building

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DRG SIZE: A3	SCALE: 1:2000	DATE: 22/11/2022
DRAWN BY: NA	CHECKED BY: RP	APPROVED BY: MD

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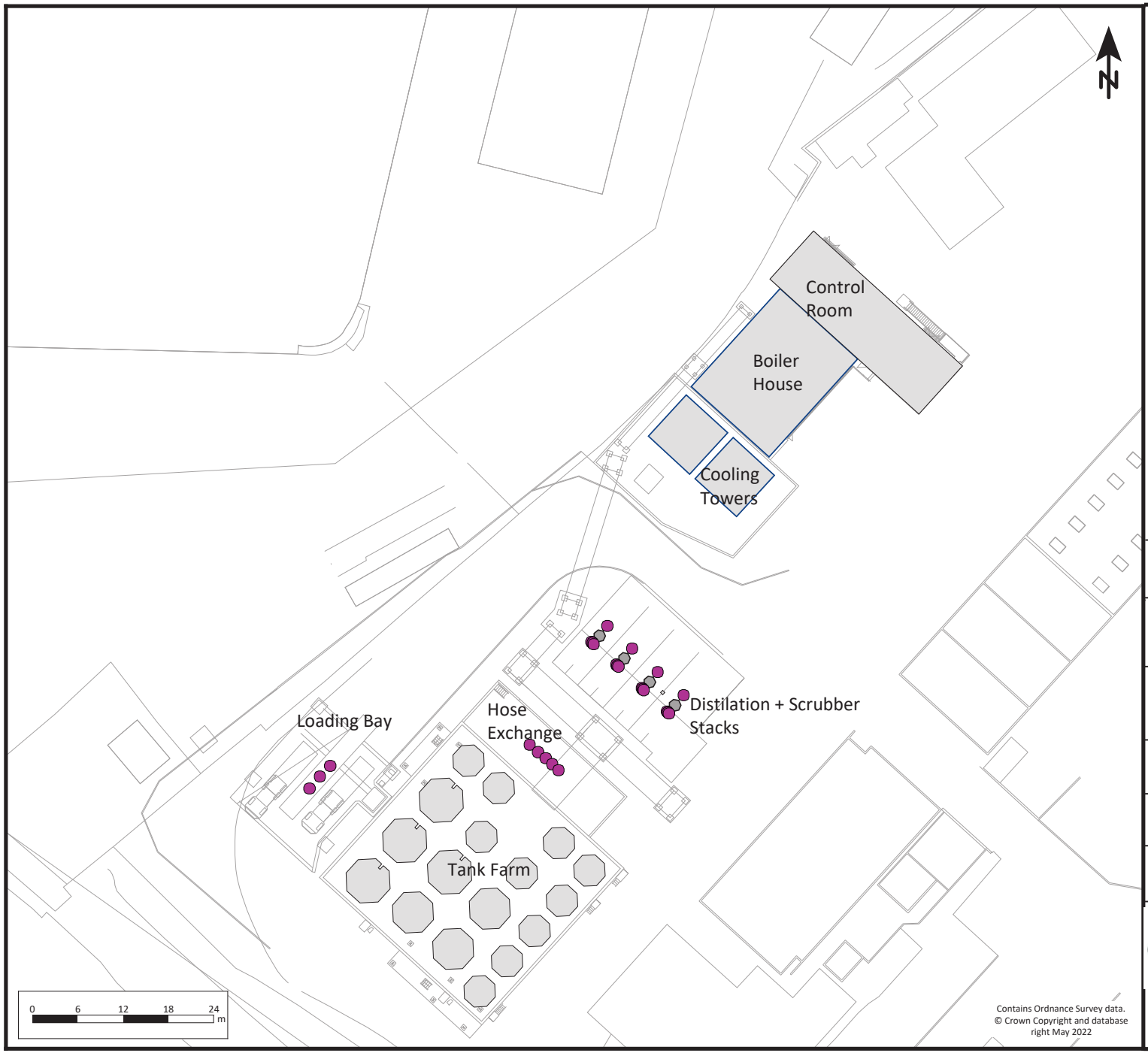

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Key

- Existing Sensitive Receptor
- Solvent Pumps
- Elevation line
- Building
- Industrial Building

CLIENT: Veolia		
PROJECT: King Street, Garston		
DRAWING TITLE: Proposed Sources of Noise		
DRG NO: CA12681-002		REV: A
DRG SIZE: A3	SCALE: 1:500	DATE: 22/11/2022
DRAWN BY NA	CHECKED BY RP	APPROVED BY MD

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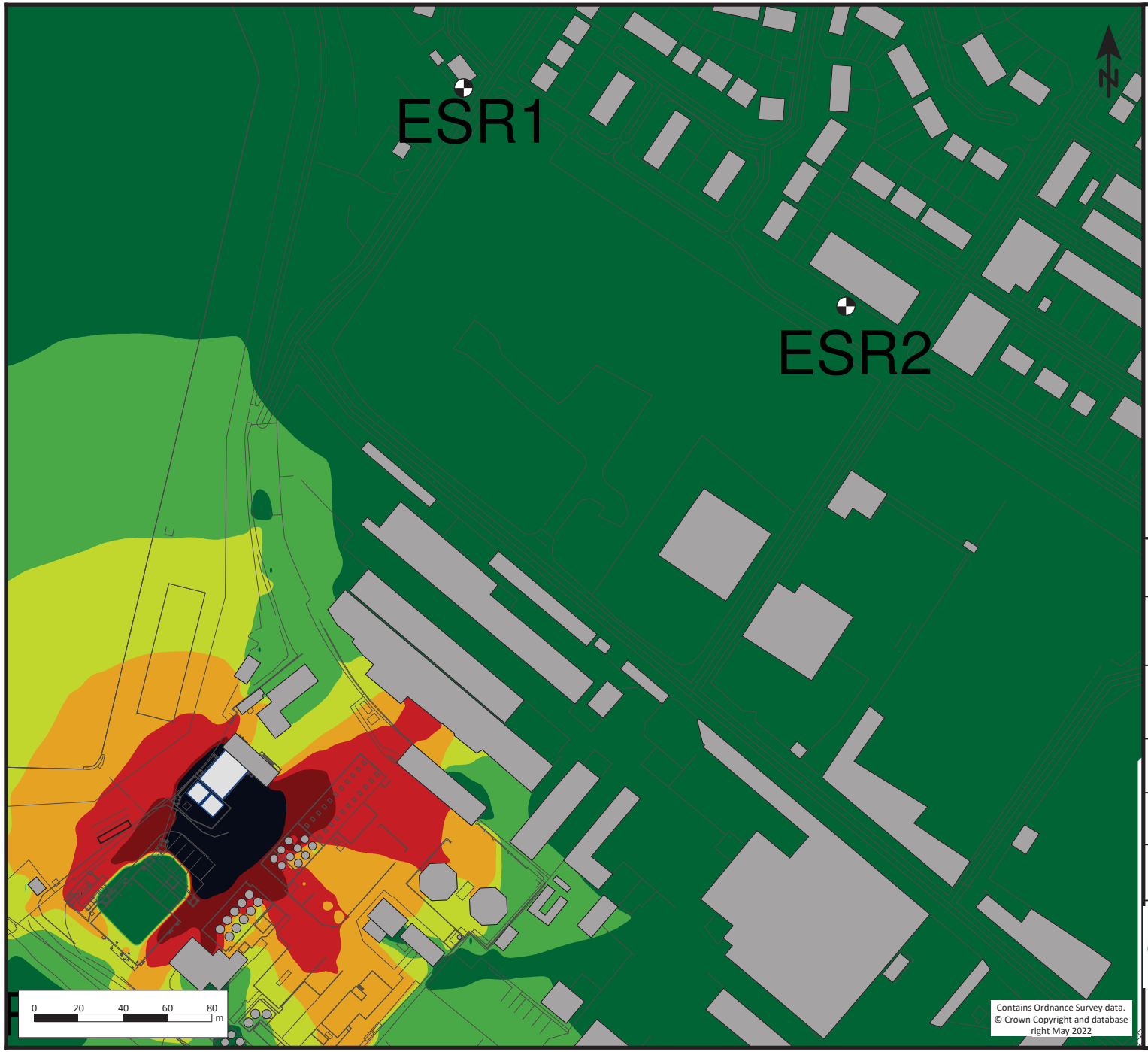

Key

- Existing Sensitive Receptor
- Elevation line
- Boiler House / Cooling Towers
- Buildings

Daytime $L_{Aeq\ 1\ hour}$ dB

	<= 35.0
35.0 -	40.0
40.0 -	45.0
45.0 -	50.0
50.0 -	55.0
55.0 -	60.0
	> 60.0

CLIENT: Veolia		
PROJECT: King Street, Garston - Phase 2		
DRAWING TITLE: Daytime (1.8m) Noise Contour Plan		
DRG NO: CA12681-003		REV: A
DRG SIZE: A3	SCALE: 1:1700	DATE: 22/11/2022
DRAWN BY NA	CHECKED BY RP	APPROVED BY MD

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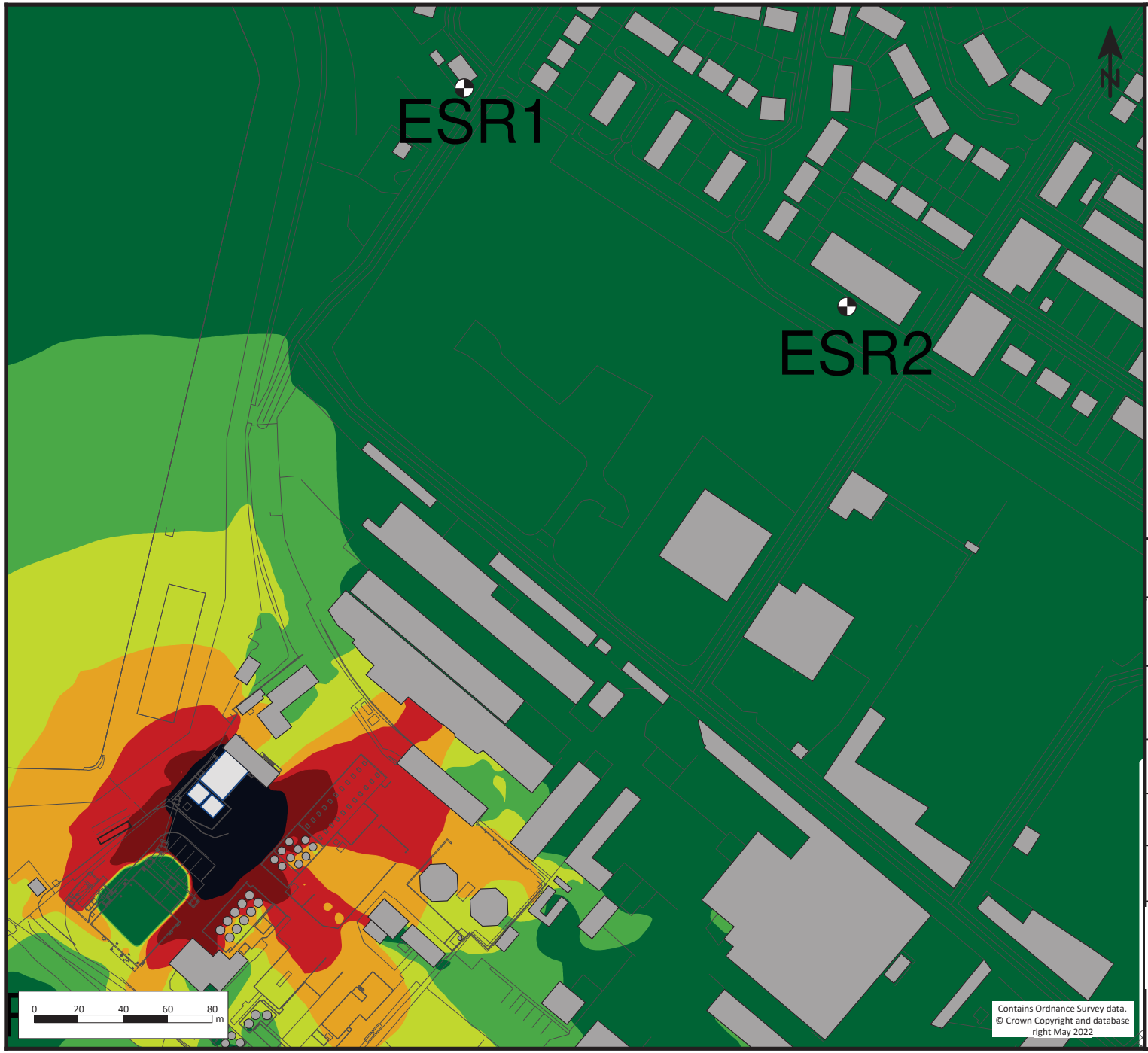

Key

- Existing Sensitive Receptor
- Elevation line
- Boiler House / Cooling Towers
- Buildings

Daytime $L_{Aeq\ 1\ hour}$ dB

	<= 35.0
35.0 -	40.0
40.0 -	45.0
45.0 -	50.0
50.0 -	55.0
55.0 -	60.0
	> 60.0

CLIENT: Veolia		
PROJECT: King Street, Garston - Phase 2		
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DRG NO: CA12681-004		REV: A
DRG SIZE: A3	SCALE: 1:1700	DATE: 22/11/2022
DRAWN BY NA	CHECKED BY RP	APPROVED BY MD

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