Southampton to London Pipeline Project

Deadline 6

Appendix E: Outline Noise and Vibration Management Plan (clean)

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Contents

Acronyms and Abbreviations

Acronym	Definition
BPM	Best Practical Means
CEMP	Construction Environmental Management Plan
CoCP	Code of Construction Practice
CoPA	Control of Pollution Act 1974
DCO	Development Consent Order
DMP	Dust Management Plan
ECoW	Environmental Clerk of Works
ES	Environmental Statement
Esso	Esso Petroleum Company, Limited
NVMP	Noise and Vibration Management Plan

1 Introduction

1.1 Overview of the Project

1.1.1 Esso Petroleum Company, Limited (Esso) is making an application for development consent to replace 90km (56 miles) of an existing pipeline to transport aviation fuel between Boorley Green in Hampshire and the Esso West London Terminal storage facility in Hounslow. The replacement pipeline is 97km long taking into account that it cannot follow the line of the existing pipeline along its whole length due to new developments and environmental constraints.

1.1.2 Esso has already replaced 10km of pipeline between Hamble and Boorley Green in Hampshire. The replacement pipeline starts near Boorley Green at the end point of the previously replaced pipeline. The route runs generally in a northeast direction via Esso's Pumping Station in Alton. It terminates at the Esso West London Terminal storage facility. The areas of land to be permanently or temporarily used for the project are known as the Order Limits.

1.1.3 Works to install and commission the pipeline are expected to start from grant of Development Consent Order (DCO) and be completed by early 2023. Certain advance works may take place prior to development consent where consented under alternative regimes, for example, the Town and Country Planning Act 1990.

1.2 Purpose of the Outline Noise and Vibration Management Plan

1.2.1 This Outline Noise and Vibration Management Plan (NVMP) has been produced as an appendix to the Outline Construction Environmental Management Plan (CEMP). The final NVMP(s) will be part of the final CEMP and would be in accordance with the Outline NVMP. The final CEMP and appendices will be produced prior to construction and will be submitted and approved by the relevant planning authorities in accordance with Requirement 6 in the DCO. Esso and its supply chain of contractor(s) would adopt the control measures set out in the final NVMP(s) when undertaking the construction of the project.

1.3 Aims and Objectives

1.3.1 The overarching aim of the NVMP(s) is to reduce noise and vibration impacts at local receptors during the construction of the pipeline and to maintain positive working relationships with local communities and the relevant planning authorities.

1.3.2 The objectives of the Outline NVMP are to define:

- the contents and scope of the final NVMP(s);
- the relevant noise and vibration thresholds from the Environmental Statement (ES) that are to be adopted during the preparation of the final NVMP(s);
- existing good practice measures in relation to noise and vibration; and

- the additional mitigation proposed to reduce significant effects identified as part of the assessment (including plans showing the locations of these areas) in relation to the management of noise and vibration.

1.3.3 The Outline NVMP is based on the results of the latest noise and vibration assessment that has been undertaken on the project. The original noise and vibration assessment was reported in ES Appendix 13.3. This was updated at Deadline 2 with a Noise and Vibration Technical Note Addendum (**Application Document REP2-060**), which included refinements about the working method. It has been further updated following representations made during the Issue Specific Hearing on 4 December 2019 and updated at Deadline 4 (**Document Reference 8.14(2)**). This assessment has informed the final wording of the commitment made on the site-specific measures (G107) later in the Outline NVMP.

1.3.4 The Outline NVMP relates only to the construction of the project, as there are no significant effects during operation.

1.4 Roles and Responsibilities

1.4.1 Overall roles and responsibilities for the project will be presented in the final CEMP. The main roles and responsibilities specific to the Outline NVMP are set out in Table 1.1 along with the specification for the roles where applicable. The final NVMP(s) will include further details in relation to organisational structure and the individuals with specific responsibilities.

Table 1.1: Roles and Responsibilities

Roles and Specification	Responsibilities
Environmental Manager	Responsible for preparing each final NVMP and for producing the methodologies relevant to noise and vibration on the project. Also responsible for obtaining the approval of the relevant planning authority.
Environmental Clerk of Works	Responsible for ensuring the mitigation set out in the final NVMP(s) is implemented, for undertaking periodic checks on site, and for investigating noise issues or complaints.

1.5 Structure of the Outline Noise and Vibration Management Plan

1.5.1 The Outline NVMP includes:

- Section 2: This contains a summary of the geographical context based on the details set out in Environmental Statement (ES) Chapter 13 (**Application Document APP-053**) and Appendix 13.3 (**Application Document APP-121**);
- Section 3: This includes the main body of the NVMP, with the good practice measures, and details about methods that will be employed to reduce noise and vibration during construction including additional mitigation measures; and
- Section 4: This outlines the site checks and reporting that will be undertaken in respect of noise and vibration.

1.5.2 Annex 1 in the final NVMP will contain the figures showing the location of proposed noise barriers that would be installed during installation. Annex 2 contains levels of

peak particle velocity associated with ground compaction works and vibratory piling from BS 5228-2:200 (see Section 3 for details).

2 Geographical Context

2.1.1 The Order Limits pass through different environments including predominantly rural areas to the south of the study area in Hampshire and in the South Downs National Park. The northern parts of the study area are generally more suburban and urban with the Order Limits passing through Farnborough, Frimley, Lightwater and Chertsey.

2.1.2 The noise assessment set out within ES Appendix 13.3 (**Application Document APP-121**) considers both residential receptors, such as residential dwellings, and also community receptors such as educational, religious and other noise-sensitive facilities. Examples within the Order Limits include Farnborough Hill and Salesian schools. Further details can be found within ES Chapter 13 (**Application Document APP-053**).

3 Outline Noise and Vibration Management Plan

3.1 Good Practice Measures

3.1.1 Esso has made a number of good practice measures which would reduce noise and vibration impacts. The commitments are indicated by a reference number, for example (G22). The good practice measures relevant to the Outline NVMP are listed in Table 3.1 and will be included in the final NVMP. The following sections of the Outline NVMP set out further details about how the construction works will be undertaken.

Table 3.1: Project Good Practice Measures Relevant to the NVMP

Commitment Number	Commitment
G22	Plant and vehicles would conform to relevant applicable standards for the vehicle type, would be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner.
G23	All plant and vehicles would be required to switch off their engines when not in use and when it is safe to do so.
G24	In the absence of a mains electricity supply, super silent pack generators would be used as an alternative power supply. A generator shall be considered 'super silent' if it meets the following criteria: • has a maximum noise output of 69 dB(A) at 7m; • is fitted with a silencer in the diesel combustion exhaust system; and • includes a layer of barrier material within the casing of the generator to reduce noise breakout.
G25	Any activity carried out or equipment located within a logistics hub or construction compound that may produce a noticeable nuisance from dust, noise, lighting etc would be located away from sensitive receptors such as residential properties or ecological sites where practicable.
G100	The Noise and Vibration Management Plan would include the following details in relation to the project within the relevant local authority area: • description of works pursuant to DCO; • scheme of work; • programme; • working hours; • plant noise and vibration data; • receptors at risk of >1.0mm/s peak particle velocity and a protocol for providing prior warning and explanation; • best practicable means (BPM) measures where applicable (as defined in Section 72 of CoPA 1974 for the control of noise and vibration); • predicted noise and vibration levels; and • BPM justification for short term higher noise/vibration levels or out of hours working and community communication details.
G102	Noise and vibration would be managed by processes and measures laid out in the CEMP. This would include to adopt BPM for the control of noise and vibration across the project.
G104	Before works commence, the site workforce would be fully briefed on the need to keep all noise generated to a low level. Shouting and raised voices would not be permitted other than in cases where warnings of danger must be given. No personal radios on site.

Commitment Number	Commitment
G108	Audible vehicle reversing sirens would be set to as low a setting as is compatible with safety requirements where possible.
G109	Noise implications would be considered when planning activities such as deliveries of pipe and bulk materials.

3.2 Construction Programme

3.2.1 The construction schedule has yet to be developed in detail, as this would be undertaken during the detailed design stage. The high-level construction programme will be included within the final CEMP. Details in relation to noise and vibration management will be added to this section in the final NVMP, for example the anticipated rates of progress for different types of open cut sections and the anticipated duration of works at trenchless crossing sites.

3.2.2 This section of the final NVMP will also outline the activities that could be undertaken outside of the 'normal working hours' and why these are required in accordance with Requirement 14 of the DCO and as set out in the CoCP. Normal working hours are between 0800 and 1800 Monday to Saturday.

3.3 Description of Works

3.3.1 A project description is set out within ES Chapter 3 (**Application Document APP-043**). This describes the main works that would be undertaken before, during and after installation.

3.3.2 This section of the final NVMP(s) will contain additional details based on the appointed contractor's final construction design and methodology, which will include:

- a general description of the working methods to be employed;
- justification of why the methods selected by the appointed contractor represent Best Practicable Means in terms of noise and vibration control;
- noise levels, types, quantities and construction duration and whether there are any differences to those assessed within the application;
- figures showing the locations of works with the potential to give rise to perceptible groundborne vibration (e.g. ground compaction, vibratory piling, auger bore and horizontal directional drilling).

3.4 Management of Change

3.4.1 The Outline NVMP is based on the assessment detailed in ES Appendix 13.3 (**Application Document APP-121**) and the Technical Note Addendum (**REP2-060**). These are based on assumptions provided during application and examination. Once the final machinery types, construction programme and other construction details are known, this assessment will be reviewed and updated accordingly. The outcomes of the final assessment, including the locations of noise barriers, would be reflected within the development of the final NVMP(s).

3.4.2 Any additional assessment supporting the final NVMP(s) will use the adopted noise and vibration levels which are as set out in Table 3.2. These are the thresholds adopted in ES Appendix 13.3 (**Application Document APP-121**) and the Noise and Vibration Technical Note Addendum Revision 2.0 (**Document Reference 8.14(2)**).

Table 3.2: Noise and Vibration Thresholds

Receptor	Limit	Relevant Location
Residential receptors (day)	A monthly average (see definition below) of 70 dB $L_{Aeq,T}$.	'Free field' location 1m from the façade of any residential receptor
Residential receptors (night)	45 dB $L_{Aeq,8h}$.	'Free field' location 1m from the façade of any residential receptor
Educational, religious, health and other noise sensitive community facilities	A monthly average (see definition below) of 65 dB $L_{Aeq,T}$.	'Free field' location 1m from the façade of any community receptor
Any building outside the works area	1.0mm/s peak particle velocity in any axis	At any building outside the works area, at measurement location defined in BS ISO 4866:2010.

3.4.3 The monthly average noise levels set out within this section of the final NVMP will be defined as the logarithmic average of the $L_{Aeq,T}$ values averaged over each working day during the four-week period with the highest levels of construction activity, calculated using BS 5228-1:2009+A1:2014.

3.5 Outline Noise and Vibration Management

3.5.1 The Outline NVMP will be provided to the contractor(s) for information so that they would have regard to the operational hours and the BPM that will be used to reduce noise and vibration during installation, in line with commitment G99 which states '*the contractor would be required to produce a Noise and Vibration Management Plan for the approval of the relevant planning authority. The Noise and Vibration Management Plan would, having regard to the approved operational hours, set out, where applicable, the best practicable means (BPM) that would be used to reduce noise and vibration during installation'*.

3.5.2 The final NVMP will be based on the final construction method and plant list. When developing the noise control measures in the final NVMP, the contractor(s) will consider the following hierarchy in accordance with commitment G98:

- control at source – for example the selection of quieter equipment;
- the choice of location for equipment on site;
- control of working hours; and
- the provision of acoustic enclosures around equipment or barriers around work sites.

3.5.3 When determining the construction method included as part of the final NVMP, the contractor will consider noise implications when planning activities such as deliveries of pipe and bulk materials in accordance with commitment G109.

Training for Construction Staff

3.5.4 The final NVMP(s) will contain details of training and toolbox talks for staff in relation to reducing noise impacts during works. This would be in accordance with commitment G28, '*Construction workers would undergo training to increase their awareness of environmental issues. Topics would include… noise reduction measures*', and commitment G104, '*Before works commence, the site workforce would be fully briefed on the need to keep all noise generated to a low level. Shouting and raised voices would not be permitted other than in cases where warnings of danger must be given. No personal radios on site'*.

Best Practical Means

3.5.5 This section sets out measures that represent BPM measures (as defined in Section 72 of the Control and Pollution Act (CoPA) 1974 for the control of noise and vibration) that will be adopted by the contractor. This addresses the requirements of commitment G102. These comprise the following measures:

- fitting compressors, percussion tools and vehicles with effective silencers of a type recommended by the manufacturers of the compressors, tools or vehicles and at least to the requirements of BS 5228-1:2009+A1:2014;
- setting audible vehicle reversing sirens on as low a setting as is compatible with safety requirements in accordance with commitment G108; and
- only using plant that conforms with or better than relevant national or international standards, directives or recommendations on noise or vibration emissions, including The Noise Emission in the Environment by Equipment for Use Outdoors Regulations 2001.

3.5.6 In addition, the final NVMP(s) will set out the BPM justification for short-term higher noise/vibration levels or out-of-hours working and community communication details in accordance with commitment G100.

3.6 Additional Mitigation Measures

3.6.1 The noise assessment set out in Appendix 13.3 Noise and Vibration Technical Note Addendum Revision 2.0 (**REP4-017**) has been used to identify the locations where there is the potential for significant effects during construction and where additional mitigation measures would be required. Annex 1 of the final NVMP will contains figures showing the locations with the potential for significant effects and where noise mitigation is proposed.

3.6.2 Based on the results of the current assessment, commitment G107 states that temporary noise screening would be put in place to screen receptors at the following locations from installation activity, unless a detailed assessment is undertaken which demonstrates that no significant noise impacts would occur without screening. Any additional locations at which screening would be installed would be identified in the Noise and Vibration Management Plan. The screening would comprise acoustic barrier material (such as Echo Barrier™ or similar) fitted to site fencing.

- Ashford: Stanwell Road, Woodthorpe Road, The Wickets, Station Road, Knapp Road, Station Approach, Kingston Road;
- Lightwater: Blackthorn Drive, Burdock Close;
- Frimley: Balmoral Drive, Berkeley Crescent, Braemar Close, Buckingham Way, Carisbrooke, Danebury Walk, Oldbury Close, Penshurst Rise, Pevensey Way, Sandringham Way, Beaumaris Parade;
- Farnborough: Ship Lane, Ringwood Road, Cove Road, Nash Close, Ship Alley, Stake Lane, Cabrol Road;
- Addlestone: Addlestone Moor, Roakes Avenue, Canford Drive, Chertsey Road;
- Staines: Ashford Road, Greenway Drive; and
- Quetta Park, Church Crookham.

3.6.3 This section of the final NVMP(s) will present a reassessment of construction noise based on the contractor(s) final construction design and methodologies, using the same thresholds as adopted in Table 3.2. The reassessment will aim to identify the locations of any additional barriers that may be required and would represent the 'detailed assessment' referred to in commitment G107.

3.6.4 The following will be reported in this section of the final NVMP(s):

- a summary of the predicted noise levels, and a list of any receptors where exceedances of the noise thresholds in Table 3.2 are expected (without barriers);
- figures showing the locations of these receptors and the extents of the proposed noise barriers; and
- confirmation that levels of noise will not meet the example thresholds used to determine eligibility for noise insulation and temporary rehousing set out in Annex E of BS5228-1:2009+A1:2014 for receptors.

3.7 Vibration Assessment

3.7.1 ES Appendix 13.3 (**Application Document APP-121**) identified that the works are not anticipated to exceed vibration levels at receptors that would cause cosmetic damage, as set out in BS 5228-2:2009. However, this would be confirmed in the final NVMP once the final working area and machinery type are known.

3.7.2 In addition, the assessment also identified that the works could create levels of vibration where peak particle velocity values could exceed 1.0mm/s. Vibration of this level in residential environments could cause complaint, but can be tolerated if given prior warning. Therefore, the final NVMP will set out locations where levels could exceed 1.0mm/s and if this was the case, notice would be given in advance to the affected residents. The locations will be derived based on the works with the potential to give rise to perceptible groundborne vibration (for example from auger boring and horizontal directional drilling) compared to the vibration levels at different distances from these types of works, as set out in Annex 2.

4 Site Checks and Reporting

4.1 Site Checks

4.1.1 The contractor(s) will be responsible for record keeping and site checks during the construction period. The contractor will undertake regular audits and inspections as part of the compliance with the requirements of the final NVMP. This will be in addition to the regular environmental inspections undertaken by the Environmental Clerk of Works (ECoW).

4.1.2 Table 4.1 in the final NVMP will set out the site check that would be undertaken during construction. Examples are provided in Table 4.1.

Table 4.1: Proposed Noise Checks for Illustration

Action	Responsibility	Frequency
Noise barriers: Checks for damage and effectiveness	*Contractor*	*At least once a week*
Checking conformance with the NVMP	*ECoW*	*Typically once a week.*

4.2 Complaints Procedure

4.2.1 The complaints procedure would follow the process set out within the final CEMP. A record would be made of the complaint or incident for audit purposes.

Annex 1: Figures showing the location of proposed noise barriers

Figures to be inserted in the final version

Annex 2: Levels of peak particle velocity associated with ground compaction works and vibratory piling from BS 5228-2:2009

Ground Compaction Works

Distance from Ground Compaction Works (m)	Peak Particle Velocity due to Ground Compaction Works (mm/s)		
	95% Confidence Level	67% Confidence Level	50% Confidence Level
20	9.3	4.8	2.5
40	3.4	1.8	0.9
60	1.9	1.0	0.5
90	1.0	0.5	0.3

Vibratory Piling Works

Distance from Ground Compaction Works (m)	Peak Particle Velocity due to Vibratory Piling Works (mm/s)		
	95% Confidence Level	67% Confidence Level	50% Confidence Level
20	5.4	2.6	1.2
40	2.2	1.0	0.5
60	1.3	0.6	0.3
90	0.8	0.4	0.2

Auger Bore and Horizontal Directional Drilling Works

As identified in ES Appendix 13.3: Noise and Vibration Technical Note, auger bore and horizontal directional drilling works are considered likely to generate similar levels of vibration to rotary bored piling due to the similar mechanisms involved. Empirical data presented in Table D.6 of BS 5228-2:2009+A1:2014 suggest that vibration from rotary bored piling activities would fall to below 1.0mm/s at a distance of approximately 10m to 15m.