

# Hampshire Water Transfer and Water Recycling Project

## Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

**VOLUME NUMBER: 6**

**PLANNING INSPECTORATE SCHEME NUMBER: WA010002**

**APPLICATION DOCUMENT REFERENCE: 6.2**

**APFP REGULATION: 5(2)(a)**

May 2026

Version 0



from  
**Southern  
Water** 

The Southern Water logo consists of three stylized, wavy blue lines of varying lengths, positioned to the right of the text 'Southern Water'.



## Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Aim of report .....	1
<b>2</b>	<b>Construction noise .....</b>	<b>2</b>
2.1	Policy and legislation .....	2
2.2	Assessment methodology.....	2
2.3	Construction noise predictions.....	5
<b>3</b>	<b>Construction ground-borne noise .....</b>	<b>80</b>
<b>4</b>	<b>Construction vibration.....</b>	<b>82</b>
4.1	Assessment methodology.....	82
4.2	Construction vibration predictions.....	86
	<b>References .....</b>	<b>91</b>

## Graphics

Graphic 4-1	Calculated vibration dose values for tunnelling operations, Transport Research Laboratory 429 .....	89
-------------	-----------------------------------------------------------------------------------------------------	----

## Tables

Table 2-1	Construction noise magnitude of impact criteria .....	4
Table 2-2	Noise model input data .....	5
Table 2-3	Details of assumed construction plant .....	7
Table 2-4	24-hour working requirements for trenchless construction works .....	21
Table 2-5	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant site 1 .....	25
Table 2-6	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant site 2 .....	25
Table 2-7	Predicted daytime construction noise levels at residential receptors - Water Recycling Plant site 3 .....	25
Table 2-8	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 1.....	26
Table 2-9	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 2.....	27
Table 2-10	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 3 .....	27
Table 2-11	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site 1 .....	28
Table 2-12	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site 2 .....	29
Table 2-13	Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site 1 .....	29
Table 2-14	Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site 2 .....	30
Table 2-15	Predicted daytime construction noise levels at residential receptors - Water Recycling Plant and Bedhampton Spring 1 .....	32
Table 2-16	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant and Bedhampton Spring 2 .....	32

**Hampshire Water Transfer and Water Recycling Project**  
**Environmental Statement – Appendix 15.1 Construction noise and vibration assessment**

Table 2-17	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Spring 1 .....	33
Table 2-18	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Spring 2 .....	34
Table 2-19	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs 1 .....	34
Table 2-20	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs 2 .....	35
Table 2-21	Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site and Bedhampton Springs 1 .....	35
Table 2-22	Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site and Bedhampton Springs 2 .....	36
Table 2-23	Predicted night-time construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs .....	36
Table 2-24	Predicted night-time construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Springs .....	37
Table 2-25	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1 .....	38
Table 2-26	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2 .....	43
Table 2-27	Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 3 .....	49
Table 2-28	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1 .....	54
Table 2-29	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2 .....	56
Table 2-30	Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 3 .....	58
Table 2-31	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1 .....	60
Table 2-32	Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2 .....	65
Table 2-33	Predicted evening and weekends construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1 .....	70
Table 2-34	Predicted evening and weekends construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2 .....	72
Table 2-35	Predicted night-time construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works .....	73
Table 2-36	Predicted night-time construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works .....	78
Table 2-37	Predicted month long compound construction noise levels at temporary construction compounds H-5 and J-1 .....	79
Table 2-38	Predicted month long compound construction noise levels at temporary construction compounds K-3, K-4 and K-5 .....	79
Table 3-1	Construction ground-borne noise significant observed adverse effect level and lowest observed adverse effect level for residential receptors .....	80
Table 3-2	Ground-borne noise criteria for non-residential receptors .....	81
Table 4-1	Construction vibration criteria for human receptors (annoyance) using peak particle velocity .....	83
Table 4-2	Construction vibration criteria for human receptors (annoyance) using Vibration Dose Value .....	84
Table 4-3	Transient vibration guide values for cosmetic damage .....	84
Table 4-4	Construction vibration criteria for assessing building damage .....	85
Table 4-5	Ground-borne vibration set-back distances .....	89

# 1 Introduction

## 1.1 Aim of report

- 1.1.1 This construction noise and vibration assessment and methodology report has been prepared to provide technical detail on the assessment of construction noise and vibration impacts from the Hampshire Water Transfer and Water Recycling Project (hereafter referred to as the 'Proposed Development').
- 1.1.2 This report is a technical appendix of Environmental Statement (ES) Chapter 15 Noise and vibration, Volume I (Document reference 6.1, DCO Volume 6).
- 1.1.3 This technical appendix should be read in conjunction with ES Appendix 15.4 Noise and vibration terminology and baseline, Volume II (Document reference 6.2, DCO Volume 6), which provides an explanation and definitions of common acoustic terminology which appears in this technical appendix.

## 2 Construction noise

### 2.1 Policy and legislation

- 2.1.1 The first aim of the Noise Policy Statement for England (NPSE) [1], as also duplicated in the National Policy Statement for Water Resources and Infrastructure [2] (NPSWRI) (Section 4.11.13) is to “*avoid significant adverse impacts on health and quality of life from noise as a result of new development*” (i.e. avoid exceedances of the significant observed adverse effect level (SOAEL)). The ‘significant observed adverse effects’ are defined by Planning Practice Guidance on Noise (PPG-N), 2019 [3] and the NPSE i.e. a material change in behaviour and/or attitude.
- 2.1.2 The Control of Pollution Act (CoPA) 1974 [4] provides a defence against nuisance action provided that Best Practicable Means (BPM, i.e. on-site noise mitigation) have been employed, which would also include implementation of off-site mitigation measures (e.g. offers of noise insulation) if required.
- 2.1.3 The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 [5] identifies British Standard (BS) 5228:2009+A1:2014 Part 1: Noise [6] and Part 2: Vibration [7] as approved codes of practice under CoPA for demonstrating that BPM have been implemented.

### 2.2 Assessment methodology

- 2.2.1 A quantitative assessment of construction noise impacts has been undertaken, based on calculations of likely worst case construction noise levels at the closest identified potentially sensitive receptors to the construction work at the point of peak construction (as determined for each receptor). Likely worst case construction noise levels have been estimated in accordance with the methodology in BS 5228-1 [6].
- 2.2.2 To avoid a potential conflict between the relevant legislative and policy requirements, the SOAELs are based on the thresholds for eligibility for noise insulation identified in BS 5228-1 Annex E.4. Where on-site mitigation is exhausted and the SOAEL is still predicted to be exceeded, the provision of noise insulation or equivalent off-site mitigation demonstrates that BPM have been implemented in accordance with the requirements of the CoPA and avoids any residual significant observed adverse effects on health and quality of life i.e. meeting the first aim of the NPSWRI.
- 2.2.3 Construction noise levels between the lowest observed adverse effect level (LOAEL) and the SOAEL have the potential to result in adverse effects but would not normally be classed as significant adverse effects. However, noise mitigation measures are still considered/applied in such locations to seek to keep all effects to a minimum, as per the second aim of the NPSE and NPSWRI.
- 2.2.4 The construction noise SOAELs are as follows:
1. Daytime (07:00 to 19:00 weekdays and 07:00 to 13:00 Saturdays) – 75 decibels (dB)  $L_{Aeq}$ , or above the existing ambient if this is higher

2. Evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays) – 65dB  $L_{Aeq}$ , or above the existing ambient if this is higher
3. Night (23:00 – 07:00) – 55dB  $L_{Aeq}$ , or above the existing ambient if this is higher

2.2.5 The construction noise LOAELs are as follows:

1. Daytime – 65dB  $L_{Aeq}$ , or above the existing ambient if this is higher
2. Evenings and weekends – 55dB  $L_{Aeq}$ , or above the existing ambient if this is higher
3. Night – 45dB  $L_{Aeq}$ , or above the existing ambient if this is higher

2.2.6 For a receptor to be eligible for noise insulation or temporary rehousing, the noise level criteria must be exceeded for at least ten days (or ten evenings/weekends or nights) in any 15, or 40 days in six months. Hence, noise impacts which are shorter than these durations could not result in exceedances of the LOAEL or SOAEL.

2.2.7 The standard working hours for construction of the Proposed Development would be as follows:

1. Monday to Friday: 07:00 to 19:00 in summer and 07:00 to 17:30 in winter
2. Saturday: 07:00 to 17:00

2.2.8 Works outside these standard working hours or overnight (including Sundays and bank holidays) may be required for construction of some aspects of the Proposed Development. A likely worst case assumption has been made these could be undertaken at night. For those works that would last at least ten nights in any 15, or 40 in any six-months (those identified in paragraph 2.3.15), impacts have therefore been assessed against the night-time LOAEL and SOAEL. It is not necessary to also assess noise from these works against the evenings and weekends criteria.

2.2.9 During standard working hours, the only requirement for construction works during the evenings and weekends period is on Saturday afternoons (13:00 to 17:00). There would never be at least 10 Saturdays in a 15-day period or 40 Saturdays in six months. On that basis, irrespective of whether noise levels exceed the evenings and weekends criteria, works on Saturday afternoon would not be of sufficient duration to cause an exceedance of the evenings and weekends LOAEL or SOAEL. Hence, the predicted noise levels have not been assessed against the evenings and weekends LOAEL and SOAEL.

2.2.10 Government policy for noise is based on community exposure response relationships and noise insulation of a typical dwelling. Consequently, an assessment based on LOAELs and SOAELs cannot be applied to all non-residential sensitive receptors. As such, impacts on non-residential receptors are considered on a case-by-case basis by considering the applicable design criteria for good indoor/outdoor noise levels, this includes consideration of whether LOAELs and SOAELs are applicable to the specific receptor type.

2.2.11 Potential airborne construction noise impacts from exposure lasting one month or more have been assessed using the criteria in Table 2-1. These are based on the assessment methodology in BS 5228-1 Annex E.3.3 (a 5dB change). Annex E.3.3 states “Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the

*pre-construction ambient noise by 5dB or more, subject to lower cut-off values of 65dB, 55dB and 45dB  $L_{Aeq,T}$  from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.” A change in ambient noise level of at least 5dB equates to a construction noise level that is at least 3dB above the baseline ambient noise level.*

**Table 2-1 Construction noise magnitude of impact criteria**

Magnitude of Impact	Construction noise level (dB $L_{Aeq,T}$ )		
	Daytime*	Evenings and weekends**	Night-time***
Major	More than or equal to 75 <sup>1</sup>	More than or equal to 65 <sup>1</sup>	More than or equal to 55 <sup>1</sup>
Moderate	More than or equal to 65 <sup>2</sup> to less than 75 <sup>3</sup>	More than or equal to 55 <sup>2</sup> to less than 65 <sup>3</sup>	More than or equal to 45 <sup>2</sup> to less than 55 <sup>3</sup>
Minor	More than or equal to 60 <sup>4</sup> to less than 65 <sup>2</sup>	More than or equal to 50 <sup>4</sup> to less than 55 <sup>2</sup>	More than or equal to 40 <sup>4</sup> to less than 45 <sup>2</sup>
Negligible	Less than 60 <sup>4</sup>	Less than 50 <sup>4</sup>	Less than 40 <sup>4</sup>

\*07:00 to 19:00 weekdays and 07:00 to 13:00 Saturdays

\*\*19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays

\*\*\*23:00 to 07:00

<sup>1</sup> and at least 5dB above the baseline ambient noise level

<sup>2</sup> or 3dB above the baseline ambient noise level, whichever is the higher

<sup>3</sup> or 5dB above the baseline ambient noise level, whichever is the higher

<sup>4</sup> or the baseline ambient noise level, whichever is the higher

2.2.12 Applying professional judgement, the following other factors have also been used to determine effect significance:

1. The location of the impact at the noise and vibration sensitive receptor (NVSR) – a receptor may contain areas which are more or less sensitive than others, for example in a school, office spaces or kitchens would be considered less sensitive than classrooms.
2. The nature, times of use and design of the receptor, for example a NVSR which is not used at night would not be considered sensitive to night-time construction works. Some non-residential NVSRs (e.g. outdoor recreation areas) are considered no more sensitive to noise during the evening and weekend than during the daytime and it would therefore be appropriate to apply the daytime impact criteria.
3. The proportion of the area affected (where a receptor is outdoors).
4. Design of the receptor affected, for example, construction of the building façade, ventilation strategy, etc.

2.2.13 BS 5228-1 states “For dwellings, times of site activity outside normal weekday and Saturday morning working hours will need special consideration. Noise control targets for the evening period in such cases will need to be stricter than those for the daytime and, when noise limits are set, the evening limit might have to be as much as 10dB(A) below the daytime limit.” It is apparent that the reason for

classifying evening and weekends as more sensitive to noise than the daytime in BS 5228-1 is to provide people in their homes with periods of respite and to protect times when people are not working. Impacts at non-residential receptors are considered on a case-by-case basis to determine whether this additional sensitivity during the evenings and weekends is applicable. Where this is not the case, the noise level criteria which are applied during the daytime are also considered applicable during the evening and weekends.

## 2.3 Construction noise predictions

2.3.1 The construction noise predictions were undertaken in accordance with the methodology presented in BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise [6].

### Modelling input data

2.3.2 Construction noise levels have been predicted using SoundPLAN v 9.1 noise modelling software. Inputs into the noise models include ground topography, ground type, and buildings to form a 3D representation of the study area. Modelling input data for these calculations are detailed in Table 2-2.

**Table 2-2 Noise model input data**

Data	Data Source
Building locations and ground attenuation areas	Ordnance Survey (OS) MasterMap
Area topography	Defra LiDAR survey data (available at <a href="#">Defra Survey Data Download</a> <sup>1</sup> )

### Noise model settings

- 2.3.3 Noise modelling has been undertaken using the following model settings:
1. Maximum search radius of 5000m
  2. Maximum number of reflections: three
  3. Daytime, evening/weekend and night-time noise predictions carried out at first floor level i.e. 4.5m above-ground
  4. Side diffraction enabled
  5. Building heights set to 6m
- 2.3.4 Ground surfaces within the noise model are generally considered soft, such as agricultural and grassland areas. Areas identified in the OS MasterMap as water, rock and man-made surfaces have been assumed to be acoustically reflective (i.e. hard).

### Construction activities and plant

2.3.5 An indicative list of plant and equipment noise levels has been provided by the project engineering team. The list has been used to make construction noise

<sup>1</sup> <https://environment.data.gov.uk/DefraDataDownload/?Mode=survey>

predictions and is summarised in Table 2-3. Where possible, noise source levels were taken using those available in BS 5228-1 Annex C and incorporate on-time corrections as per the calculation methodology in BS 5228-1 [6].

**Table 2-3 Details of assumed construction plant**

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
<b>Temporary construction compounds</b>						
Compound operation	Diesel generator	1	102	100%	-	c4.84
	tractor and low loader	1	108	80%	-	c4.74
	Telescopic handler (10t)	1	99	80%	-	c2.35
	Excavator (25/30t)	1	105	80%	-	c2.19
Enabling, setup of site hoarding and compounds	Diesel generator	1	102	100%	-	c4.84
	Lorry/Dump truck	1	105	10%	-	c11.10
	Post Driver	1	116	20%	-	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Tracked excavator	1	106	80%	-	c2.3
	Electric Hammer drill	1	106	15%	-	d6.52
	Electric Saw	1	110	10%	-	d7.77
	Wheeler Loader (loading lorry)	1	110	25%	-	c6.33
	Handheld cordless nail gun	1	101	20%	-	c4.95
<b>Pipeline route enabling – easement fencing, topsoil strip, hedge removal</b>						
Installing pre-construction drainage	Excavator (25t)	1	103	10%	-	c2.18
	Excavator (15t)	1	101	80%	-	c2.24
	Gravel cart	1	113	80%	-	c10.10
	Trencher	1	105	70%	-	d3.106
	Tractor and trailer	1	108	20%	-	c4.74

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>wA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
Silt fencing and surface water management	Excavator (8t)	1	99	50%	-	c4.17
	Pump	1	93	100%	-	C2.44
	Sledge Hammer	1	102	30%	-	c1.19*
<b>Vegetation removal/fencing, topsoil and mound formation, and access point creation</b>						
Vegetation removal	Chainsaw	2	114	50%	-	d2.14
	Strimmer	1	105	50%	-	f1
	Excavator (8t)	1	99	50%	-	c4.17
	Woodchipper	1	117	70%	-	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Tractor and trailer	1	108	20%	-	c4.74
	Tractor with hedge cutter	1	113	80%	-	c4.74*
Fencing	Post driver	1	116	70%	-	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Tractor (towing equipment)	1	108	50%	-	c4.74
	Quad bike and trailer	1	108	70%	-	c4.74
Topsoil strip and mound formation	Excavator (25/30t)	2	105	60%	-	c2.19
	Excavator (25t)	1	103	60%	-	c2.18
	Bulldozer (20t)	2	107	80%	-	c2.11
Access point creation	Excavator (15t)	1	101	70%	-	c2.24

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Vibratory roller (3t)	1	101	30%	-	c2.40
	Vibratory plate (3kW)	1	108	15%	-	c2.41
	Tractor with hedge cutter	1	113	20%	-	c4.74
	Large lorry concrete mixer	1	105	15%	-	c4.21
	Dump truck	1	104	70%	-	c4.4
	Excavator mounted breaker	1	121	20%	-	c9.11
	Power pack	1	102	20%	-	c1.8
<b>Pipe welding above-ground</b>						
Pipe welding above-ground	Welding equipment	2	101	80%	-	c3.32
	Excavator (35t)	1	99	80%	-	c2.21
	Generator	1	88	80%	-	c4.77
<b>Trenchless construction works (under roads and watercourses)</b>						
Microtunnelling shaft construction	Crawler crane (100t)	1	99	70%	-	c4.41
	Cleaning water tanks	1	107	70%	-	c4.89
	Fan unit	1	101	100%	-	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Concrete pump	1	106	20%	-	c4.32
	Concrete scabbler	1	101	50%	-	d6.45*
	Concrete vibrating poker	1	87	20%	-	c4.34*
	Electric Circular Saw	1	110	20%	-	d7.77
	Floor saw	1	109	20%	-	c4.70*

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>wA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Grinder	1	108	20%	-	c4.93
	Hand spade	1	103	50%	-	d3.102*
	Handheld power tools	3	100	20%	-	d7.77*
	Jacking Station	1	91	30%	-	c3.9
	Jet wash - Electric	1	96	20%	-	c4.88
	Compressor	1	103	30%	-	c3.19
	Telehandler (core)	1	98	50%	-	c4.55
	Vibratory piling rig	1	116	30%	-	c3.8
	Wacker plate compactor	1	105	20%	-	d3.120
	Diesel generator (500 kVA)	1	94	100%	-	c4.78
	Concrete truck(25t)	1	104	20%	-	c4.22
	Excavator (15t)	2	101	70%	-	c2.24
	Excavator with breaker/rock wheel attachment (13t)	1	121	30%	-	c9.11
	Dump truck	1	104	70%	-	c4.4
Microtunnelling (24h)	Pumps	2	93	100%	100%	c2.45
	Excavator (15t)	2	101	70%	50%	c2.24
	Diesel generators	1	94	100%	100%	c4.78
	Diesel generator (500 kVA)	1	94	100%	100%	c4.78
	Cleaning water tanks	1	107	100%	100%	c4.89
	Lubrication mixing and injection plant (bentonite)	1	101.4	100%	100%	Man – Tracto MIXING SYSTEM MA07 [9]

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>wA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Fan unit	1	101	100%	100%	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Jet wash – Electric	1	96	20%	-	c4.88
	Mobile elevating work platform (MEWP)	1	105	50%	50%	c4.53
	Telehandler (core)	1	98	70%	30%	c4.55
	Wacker plate compactor	1	105	20%	-	d3.120
	Crawler crane (100t)	1	99	70%	70%	c4.41
	Powerpack for jacking stations	2	88	100%	100%	c3.7*
	Generator for lighting tower	2	93	-	100%	c4.87
Pipe jacking -pipe install	Diesel generator (500 kVA)	1	94	100%	-	c4.78
	Excavator (40t)	1	105	70%	-	c4.63
	Excavator (15t)	2	101	70%	-	c2.24
	Compressor (1t)	1	103	70%	-	c3.19
	Fan unit	1	101	100%	-	Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology [8]
	Concrete pump	1	106	70%	-	c4.32
	Jet wash - Electric	1	96	20%	-	c4.88
	MEWP	1	105	50%	-	c4.53

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Telehandler (core)	1	98	50%	-	c4.55
	Wacker plate compactor	1	105	20%	-	d3.120
	Welding Equipment - Mig	1	111	20%	-	c3.32
	Crawler crane (100t)	1	99	70%	-	c4.41
	Dump truck (tipping fill, 29t)	1	107	60%	-	c2.30
<b>Road construction works – open-cut (sleeved)</b>						
Open-cut through road crossing – (Includes pipe welding above-ground)	Excavator (25/30t)	1	105	70%	-	c2.19
	Excavator (25t)	1	103	70%	-	c2.18
	Vibratory roller (3t)	1	101	30%	-	c2.40
	Vibratory plate (3kW)	1	108	30%	-	c2.41
	Circular saw cutting concrete slabs	1	115	30%	-	c5.36
	Dump truck (tipping fill, 29t)	1	107	50%	-	c2.30
	Asphalt paver and tipper lorry	1	105	10%	-	c5.31
	Tar squad (Lorry/hotbox)	1	110	10%	-	c6.23
	Dump truck (tipping fill, 29t)	1	107	80%	-	c2.30
	Vibratory roller	1	107	30%	-	c2.37
	Excavator mounted breaker	1	121	20%	-	c9.11
	Power pack	1	102	20%	-	c1.8
<b>Cross country pipeline installation</b>						
PE pipe stringing	Excavator (25/30t)	2	105	80%	-	c2.19
	Dump truck	1	104	70%	-	c4.4
	Tractor and trailer	1	108	30%	-	c4.74

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>wA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
Opencut mains laying – includes pipe welding above-ground	Excavator (40t)	1	107	70%	-	c2.14
	Excavator (25/30t)	1	105	70%	-	c2.19
	Excavator (15t)	1	101	70%	-	c2.24
	Pumps	2	93	100%	-	c2.45
	Excavator with breaker (29t)	1	121	20%	-	c9.11
	Telescopic handler (10t)	1	99	50%	-	c2.35
	Dump truck (tipping fill, 29t)	2	107	50%	-	c2.30
	Tracked crusher crushing rubble (47t)	1	110	70%	-	c1.14
	Vibratory plate (3kW)	1	108	70%	-	c2.41
	Trencher	1	105	70%	-	d3.106
	Excavator (25/30t)	1	105	80%	-	c2.19
Water storage lagoon construction	Telescopic handler (4t)	1	107	80%	-	c4.54
	Dump truck (tipping fill, 29t)	1	107	50%	-	c2.30
	Excavator (25/30t)	1	105	80%	-	c2.19
	tractor and low loader	2	108	80%	-	c4.74
	Dump truck	1	104	40%	-	c4.4
	Excavator (25t)	1	103	50%	-	c2.18
	Excavator (15t)	1	101	50%	-	c2.24
	Diesel generator	1	102	80%	-	c4.84
	Pumps	2	93	80%	-	c2.45
	Vibratory roller (3t)	1	101	30%	-	c2.40
<b>Pipeline route reinstatement</b>						

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
Subsoil and topsoil reinstatement	Subsoil ripping - Dozer (30t)	1	107	80%	-	c2.11
	Topsoil spreading - Dozer (30t)	1	107	80%	-	c2.11
	Excavator (25/30t)	1	105	80%	-	c2.19
	Excavator (25/30t)	2	105	80%	-	c2.19
	tractor and harrow	1	108	100%	-	c4.74
	tractor and plough	1	108	100%	-	c4.74
	tractor and seeding machine	1	108	100%	-	c4.74
	tractor and trailer	1	108	30%	-	c4.74
<b>Above Ground Plant (AGP) – Break Pressure Tanks (BPT) and Intermediate Pumping Station (IPS)</b>						
Site clearance, enabling works and groundworks	Tracked excavator (15t )	1	101	80%	-	c2.24
	Excavator (25t)	1	103	80%	-	c2.18
	Dump truck	2	104	80%	-	c4.4
	CFA Piling	1	108	80%	-	c3.22
Reinforced concrete works and steel framed structures	MEWP	4	105	40%	-	c4.53
	Mobile generators	2	102	80%	-	c4.84
	Disc cutters	2	112	20%	-	d6.53
	Wheeler loader (loading lorry)	1	110	20%	-	c6.33
	Vibratory poker	1	106	10%	-	c4.33
	Power tools (circular saw etc)	3	110	20%	-	d7.77
	Compressor	1	103	10%	-	c3.19
	Truck mounted concrete pump and boom arm	1	108	10%	-	c4.29

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>wA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Towable jet wash and water bowser	1	111	10%	-	c6.38
	Mobile crane (250t)	1	104	80%	-	c5.37
Mechanical and electrical installation	MEWP	1	105	50%	-	c4.53
	Mobile crane (100t)	1	103	80%	-	c4.52
	mobile generators	2	102	80%	-	c4.84
	Power tools (circular saw etc)	3	110	20%	-	d7.77
External works	Excavator (25t)	1	103	80%	-	c2.18
	Dump truck	1	104	80%	-	c4.4
	Roller	1	108	20%	-	c5.19
	Telescopic handler (all terrain)	1	98	80%	-	c4.55
	Concrete pump	1	106	10%	-	c3.25
	Water bowser (releasing)	1	109	10%	-	c6.37
Temporary welfare set up including generator and solar power sources	Diesel generator	1	94	100%	-	c4.78
	Bomag roller 1200	1	108	20%	-	c5.19
	Tracked excavator (15t)	1	101	80%	-	c2.24
	Dump truck	2	104	40%	-	c4.4
	Water bowser (releasing)	1	109	10%	-	c6.37
	Road sweeper	1	104	20%	-	c4.90
<b>Water Recycling Plant site construction</b>						
Water Recycling Plant (WRP) site enabling works	D6 and D9 dozers	5	108	50%	-	c2.10
	25t Dumper	4	101	50%	-	d3.98
	35t Dumper	4	103	50%	-	d7.87

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	35t Excavator	2	103	40%	-	c2.16
	20t Excavator	2	97	40%	-	c2.25
	12t Roller	3	103	20%	-	c5.25
	Towed troller	2	103	20%	-	c5.25
	Diesel bowsers	1	109	50%	-	c6.37
	Deliveries, lorry/dump truck	2	105	10%	-	c11.10
WRP site – piling works	30t Crawler crane	1	98	50%	-	c4.43
	20t Excavator	6	97	50%	-	c2.25
	12t and 6t dump trucks	6	105	50%	-	c11.10
	12t Roller	2	103	25%	-	c5.25
	Compressors	16	93	50%	-	c5.5
	Tool generator	4	102	20%	-	c4.84
	Concrete pump	4	103	50%	-	c4.18
	Telehandler	2	99	50%	-	c2.35
	CFA piling rig	4	108	50%	-	c3.22
	Deliveries, lorries	10	105	10%	-	c11.10
WRP site – pile caps and foundations civils' works	50t Crawler crane	1	105	50%	-	c4.39
	30t Crawler crane	1	98	50%	-	c4.43
	50t Tower crane	1	104	50%	-	c4.48
	20t Excavator	2	97	40%	-	c2.25
	Towable jet wash and water bowser	2	111	20%	-	c6.38
	Disc cutters	2	112	20%	-	d6.53

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Vibratory poker	6	106	20%	-	c4.33
	Compressors	2	93	30%	-	c5.5
	Tool generator	6	102	30%	-	c4.84
	Concrete pump	2	103	25%	-	c4.18
	Telehandler	2	99	50%	-	c2.35
	Power tools (circular saw etc)	6	113	20%	-	c4.71
	Deliveries, lorries	10	105	10%	-	c11.10
WRP site – buried utilities/civils' works	20t Excavator	2	97	60%	-	c2.25
	12t and 9t excavator	2	97	60%	-	c2.25
	Vibratory plate (3kW)	2	108	25%	-	c2.41
	12t and 6t dump trucks	4	105	40%	-	c11.10
	12t Roller	1	103	25%	-	c5.25
	Compressors	4	93	25%	-	c5.5
	Site generator	1	102	100%	-	c4.84
	Tool generator	4	102	20%	-	c4.84
	Telehandler	2	99	50%	-	c2.35
	Sheet piling hammer attachment	2	116	10%	-	C3.8
	Deliveries, lorries	10	105	10%	-	c11.10
WRP site – steel frame building and cladding install	50t Crawler crane	1	105	50%	-	c4.39
	Mobile crane (250t)	1	104	50%	-	c5.37
	50t Tower crane	1	104	75%	-	c4.48
	MEWP	6	105	75%	-	c4.53

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Compressors	2	93	40%	-	c5.5
	Power tools (circular saw etc)	4	113	40%	-	c4.71
	Tool generator	2	102	40%	-	c4.84
	Telehandler	1	99	50%	-	c2.35
	Deliveries, lorries	10	105	10%	-	c11.10
WRP site – site-wide Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) install – process plant	50t Crawler crane	1	105	50%	-	c4.39
	Mobile crane (250t)	1	104	50%	-	c5.37
	50t Tower crane	1	104	75%	-	c4.48
	MEWP	6	105	75%	-	c4.53
	Compressors	2	93	40%	-	c5.5
	Power tools (circular saw etc)	4	113	40%	-	c4.71
	Tool generator	2	102	40%	-	c4.84
	Telehandler	1	99	50%	-	c2.35
	Deliveries, lorries	10	105	10%	-	c11.10
WRP site construction – site roads and reinstatement works	20t Excavator	2	97	40%	-	c2.25
	12t and 9t Excavator	2	97	40%	-	c2.25
	Vibratory plate (3kW)	2	108	20%	-	c2.41
	12t and 6t dump trucks	4	105	40%	-	c11.10
	12t Roller	1	103	25%	-	c5.25
	Compressors	2	93	20%	-	c5.5
	Towable jet wash and water bowser	2	111	10%	-	c6.38
	Disc cutters	2	112	10%	-	d6.53

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Vibratory poker	6	106	10%	-	c4.33
	Tool generator	2	102	20%	-	c4.84
	Telehandler	1	99	20%	-	c2.35
	Concrete pump	1	103	10%	-	c4.18
	Power tools (circular saw etc)	6	113	10%	-	c4.71
	Deliveries, lorries	10	105	10%	-	c11.10
<b>Tunnelling</b>						
Construction of shafts	22t Excavator	1	103	50%	-	c2.18
	16t Excavator	2	98	50%	-	c2.7
	80t Crawler	1	105	50%	-	c4.39
	50t Crawler crane	1	98	50%	-	c4.43
	Piling rig for secant piles	1	108	80%	-	c12.42
	Spoil wagon/dump Truck	3	105	10%	-	c11.10
	Telescopic handler	1	98	15%	-	c2.35
	Dewatering pump	2	93	100%	-	c2.45
	Diesel generator 250kva	1	94	80%	-	c4.78
	Concrete truck	3	106	20%	-	c4.32
	180 and 260 compressors	2	93	50%	-	c5.5
	Concrete pump	1	106	25%	-	C3.25
Tunnelling	30t Excavator	1	103	25%	25%	c2.16
	5t Excavator	1	98	25%	25%	c2.7
	80t Crawler crane	1	105	75%	75%	c4.39

Hampshire Water Transfer and Water Recycling Project  
 Environmental Statement – Appendix 15.1 Construction noise and vibration assessment

Activities	Plant	No.	L <sub>WA</sub> (dB)	% On-Time	Night-time % on-time	Reference (BS 5228-1 unless stated otherwise)
	Separation plant	1	105	75%	75%	Silvertown Tunnel preliminary Environmental Report: Appendix 14.A Construction Noise [10]
	Generator 185kva	1	94	100%	100%	c4.78
	Grout mixer/pump	1	108	50%	50%	d6.13
	Mobile crane	1	104	20%	20%	c5.37
	Lorry/dump truck	2	105	10%	10%	c11.10
	Telescopic handler	1	99	75%	75%	c2.35
	Dewatering pump	1	93	100%	100%	c2.45
	Diesel generator	1	94	100%	100%	c4.78
	Concrete mixer truck	1	106	10%	0%	c4.32
Shaft dewatering	Dewatering pump	1	93	100%	-	c2.45
	Diesel generator	1	94	100%	-	c4.78
Recover Tunnel Boring Machine (TBM)	Mobile crane	1	98	25%	-	c4.43
	30t Excavator	1	103	40%	-	c2.16
	5t Excavator	1	98	50%	-	c2.7
	Lorry/dump	1	105	10%	-	c11.10
* Denotes a 'correction' has been applied to the sound power level. These corrections include: +5dB for tractor with hedge cutter, sledgehammer and mobile pipe welder tracked unit and -10dB for source at bottom of pipejacking shaft. 'Man' refers to manufacturer's data						

## Works durations

2.3.6 To inform calculations of likely impact durations, the following progression rates of mobile activities were supplied by the construction design engineers. These are understood to be based on average depths, ground conditions, weather conditions etc.:

1. Enabling (top soil strip, fencing, string out pipes etc.) – 400m/week
2. Pipe laying (dig trench, lay pipe, backfill) – 200m/week
3. Reinstatement – 300m/week
4. Microtunnelling – 3m/shift

2.3.7 Some asset owners and/or Operators may require that trenchless crossing works under their asset (e.g. a road) must be undertaken on a 24-hourly basis, for example to reduce traffic disruption. Works duration would depend on several factors such as the exact trenchless technique used and ground conditions. The crossings for which these restrictions are anticipated, their length and the resultant duration of 24-hourly working (based on a progression rate of 3m per 12-hour shift) are identified in Table 2-4.

**Table 2-4 24-hour working requirements for trenchless construction works**

Name	Length of works (m)	Obstruction type	24-hourly working required	Distance of 24-hour working required	Duration (days) of 24-hour working
Bow Lake	50	River	No	N/a	N/a
A32 Hoads Hill	62	Main A Road	Potentially through Zone of Influence of road	25	4
B3354 Winchester Road	69	Road	Potentially through Zone of Influence of Road	25	4
A334 Winchester Road	112	Main A Road	Potentially through Zone of Influence of road	25	4
B2177 Winchester Road/Saint Annes Lane crossing	151	Main Road and Lane	Potentially through Zone of Influence of road	25	4
High Street and Lane	160	High Street and Lane	Potentially through Zone of Influence of houses	120	20
Winters Hill road crossing	161	Road	Potentially through Zone	25	4

Name	Length of works (m)	Obstruction type	24-hourly working required	Distance of 24-hour working required	Duration (days) of 24-hour working
			of Influence of road		
Woodland South of Portsmouth Road	188	Woodland	No	N/a	N/a
Otterbourne crossing	190	River	No	N/a	N/a
Alternate trenchless crossing of the River Meon	231	Road and river	No	N/a	N/a
Botely Road River Hamble	248	Road and river	Potentially through Zone of Influence of Road	25	4
River Meon Crossing	276	Minor road and river	No	N/a	N/a
River Wallington crossing	312	River	No	N/a	N/a
WRP site to Budds Farm	713	Main road and river	Potentially through Zone of Influence of Road	150	25
Highbridge Road and Railway	1208	Road and railway	Potentially through Zone of Influence of road and railway	900	150

2.3.8 The majority of the works are anticipated to last for at least one month in any location; hence, predicted noise levels have been compared with the identified LOAEL and SOAEL values and the construction noise magnitude of impact assessment criteria in Table 2-1.

2.3.9 The following activities located along the Pipeline between the WRP site and Otterbourne Water Supply Works (WSW) are anticipated to last for less than one month but at least 10 days in any 15 days; hence, impacts are only assessed with reference to the LOAEL and SOAELs:

1. Trenchless construction works – Shaft construction
2. Open-cut road construction works
3. Pipeline – construction
4. Enabling, setup of site hoarding and compounds (hereafter referred to as ‘compound construction’) (except the WRP site and L-10 which would last for one month)

5. Micro-tunnelling (only crossings of the A32 between compounds G-1 and G-2, the B3554 Winchester Road (compounds L-5 and L-6) and Bow Lake (compounds L-7 and L-8), the remainder would last at least one month)
6. Trenchless crossings – Pipe installation

- 2.3.10 Most individual short-term activities are sufficiently separated by gaps in the construction programme such that there is no potential for them to result in month-long impacts at receptors. However, those short-term activities to be located in a compound (compound construction, shaft construction, micro-tunnelling, and pipe installation associated with trenchless crossing) could be part of a sequence of consecutive short-term activities that, in-combination, have the potential to cause impacts at the same receptor which last a month or more; hence, the magnitude of impact has been determined.
- 2.3.11 To assess month-long effects from potential sequential activities, the predicted noise level on the 26<sup>th</sup> loudest day has been identified. For activities which are in the same compound, the 26<sup>th</sup> loudest day has been identified as occurring during the trenchless crossing pipe installation phase.
- 2.3.12 In addition, the following compounds are sufficiently close together that the identified activities which are expected to be sequential have the potential to cause impacts at receptors lasting at least one-month:
1. Construction of compounds B1-1 and B1-2 (impacts assessed in Table 2-15 and Table 2-17)
  2. Construction of compounds H-5 and J-1 (impacts not tabulated but provided in narrative form after Table 2-37)
  3. Construction of compounds K-3, K-4 and K-5 (impacts not tabulated but provided in narrative form after Table 2-38)

## Results

- 2.3.13 The results of the noise modelling are provided by Proposed Development component in Table 2-5 to Table 2-36, with levels calculated at the receptors and monitoring locations shown on ES Figure 15.1 Noise and vibration direct effects study areas, sensitive receptors and monitoring locations, Volume III (Document reference 6.3, DCO Volume 6).
- 2.3.14 Where the identified activity is sufficiently distant from the NVSR to have no impact on noise levels, no noise level has been calculated. This is indicated in the results tables by a '-'.
- 2.3.15 All activities are assumed to be limited to daytime, evening or weekend working hours aside from the following activities, which have been calculated for night-time hours:
1. Tunnel Boring Machine tunnelling
  2. Road crossings (limited to specific locations)
  3. Trenchless crossing – Microtunnelling (limited to specific locations – see Table 2-4)
- 2.3.16 Calculations of noise from works at the bottom of proposed tunnel shafts (i.e. tunnelling) have incorporated 10dB of attenuation, due to the shaft walls providing

screening between the plant and NVSR. This is considered representative of a likely worst case.

- 2.3.17 Due to the extensive number of activities, the results have been distributed across multiple tables. This is indicated in the table titles by the addition of numerical suffixes (e.g. 1, 2, etc.).

*Water Recycling Plant site*

- 2.3.18 The results for the noise calculations associated with the construction of the WRP site only are presented in Table 2-5 to Table 2-14.

- 2.3.19 To assess a worst-case scenario, TBM tunnelling works have been assumed to overlap with piling works and subsequently with pile caps and foundation activities. As such, the following scenarios have been assessed:

1. WRP site – Enabling works
2. WRP site – Piling works and TBM tunnelling
3. WRP site – Pile caps and foundation and TBM tunnelling
4. WRP site – Buried utilities/civils' works
5. WRP site – Steel frame building and cladding install
6. WRP site – Site-wide MEICA install – process plant
7. WRP site – Site road works

**Table 2-5 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant site 1**

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Enabling works			Piling works			Pile caps and foundations		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	66	58	< LOAEL	Negligible	59	< LOAEL	Negligible	59	< LOAEL	Negligible
R3	62	55	< LOAEL	Negligible	56	< LOAEL	Negligible	56	< LOAEL	Negligible
R4	68	49	< LOAEL	Negligible	51	< LOAEL	Negligible	51	< LOAEL	Negligible
R5	54	42	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R6	54	48	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R10	54	45	< LOAEL	Negligible	45	< LOAEL	Negligible	45	< LOAEL	Negligible
R80	53	48	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R81	55	47	< LOAEL	Negligible	47	< LOAEL	Negligible	47	< LOAEL	Negligible
R194	59	47	< LOAEL	Negligible	53	< LOAEL	Negligible	54	< LOAEL	Negligible

**Table 2-6 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant site 2**

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Buried utilities/civils' works			Steel frame building and cladding install			Site-wide MEICA install – process plant		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	66	57	< LOAEL	Negligible	58	< LOAEL	Negligible	58	< LOAEL	Negligible
R3	62	55	< LOAEL	Negligible	55	< LOAEL	Negligible	55	< LOAEL	Negligible
R4	68	49	< LOAEL	Negligible	50	< LOAEL	Negligible	50	< LOAEL	Negligible
R5	54	41	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R6	54	41	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R10	54	38	< LOAEL	Negligible	45	< LOAEL	Negligible	45	< LOAEL	Negligible
R80	53	41	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R81	55	41	< LOAEL	Negligible	47	< LOAEL	Negligible	47	< LOAEL	Negligible
R194	59	45	< LOAEL	Negligible	47	< LOAEL	Negligible	47	< LOAEL	Negligible

**Table 2-7 Predicted daytime construction noise levels at residential receptors - Water Recycling Plant site 3**

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Site roads works		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	66	57	< LOAEL	Negligible
R3	62	55	< LOAEL	Negligible
R4	68	49	< LOAEL	Negligible
R5	54	41	< LOAEL	Negligible
R6	54	42	< LOAEL	Negligible

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Site roads works		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R10	54	44	< LOAEL	Negligible
R80	53	42	< LOAEL	Negligible
R81	55	46	< LOAEL	Negligible
R194	59	46	< LOAEL	Negligible

Table 2-8 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 1

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Enabling works			Piling works			Pile caps and foundations		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	66	62	< LOAEL	Negligible	63	< LOAEL	Negligible	63	< LOAEL	Negligible
R11 - Old Mill house	66	54	< LOAEL	Negligible	56	< LOAEL	Negligible	56	< LOAEL	Negligible
R73 - Allotments at James Road	51	41	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	51	40	< LOAEL	Negligible	42	< LOAEL	Negligible	48	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	54	44	< LOAEL	Negligible	51	< LOAEL	Negligible	51	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	54	42	< LOAEL	Negligible	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	51	39	< LOAEL	Negligible	46	< LOAEL	Negligible	46	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	51	45	< LOAEL	Negligible	45	< LOAEL	Negligible	45	< LOAEL	Negligible
R160 - Church of St Thomas	59	54	< LOAEL	Negligible	54	< LOAEL	Negligible	55	< LOAEL	Negligible
R163 - Bedhampton Community Centre	59	47	< LOAEL	Negligible	49	< LOAEL	Negligible	49	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	59	64	< LOAEL	Minor	65	> LOAEL & < SOAEL	Moderate	65	> LOAEL & < SOAEL	Moderate
R215 - Bedhampton Methodist Church	62	48	< LOAEL	Negligible	48	< LOAEL	Negligible	49	< LOAEL	Negligible

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Enabling works			Piling works			Pile caps and foundations		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	56	51	< LOAEL	Negligible	51	< LOAEL	Negligible	51	< LOAEL	Negligible

**Table 2-9 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 2**

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Buried utilities/civils' works			Steel frame building and cladding install		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	66	62	< LOAEL	Negligible	63	< LOAEL	Negligible
R11 - Old Mill house	66	54	< LOAEL	Negligible	55	< LOAEL	Negligible
R73 - Allotments at James Road	51	40	< LOAEL	Negligible	41	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	51	39	< LOAEL	Negligible	41	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	54	43	< LOAEL	Negligible	50	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	54	41	< LOAEL	Negligible	48	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	51	39	< LOAEL	Negligible	45	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	51	38	< LOAEL	Negligible	45	< LOAEL	Negligible
R160 - Church of St Thomas	59	54	< LOAEL	Negligible	54	< LOAEL	Negligible
R163 - Bedhampton Community Centre	59	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	59	63	< LOAEL	Minor	64	< LOAEL	Minor
R215 - Bedhampton Methodist Church	62	42	< LOAEL	Negligible	48	< LOAEL	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	56	45	< LOAEL	Negligible	51	< LOAEL	Negligible

**Table 2-10 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant site 3**

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Site-wide MEICA install – process plant			Site roads works		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	66	63	< LOAEL	Negligible	62	< LOAEL	Negligible
R11 - Old Mill house	66	55	< LOAEL	Negligible	54	< LOAEL	Negligible

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Site-wide MEICA install – process plant			Site roads works		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R73 - Allotments at James Road	51	41	< LOAEL	Negligible	40	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	51	41	< LOAEL	Negligible	40	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	54	50	< LOAEL	Negligible	44	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	54	48	< LOAEL	Negligible	41	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	51	45	< LOAEL	Negligible	39	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	51	45	< LOAEL	Negligible	39	< LOAEL	Negligible
R160 - Church of St Thomas	59	54	< LOAEL	Negligible	54	< LOAEL	Negligible
R163 - Bedhampton Community Centre	59	48	< LOAEL	Negligible	46	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	59	64	< LOAEL	Minor	63	< LOAEL	Minor
R215 - Bedhampton Methodist Church	62	48	< LOAEL	Negligible	48	< LOAEL	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	56	51	< LOAEL	Negligible	45	< LOAEL	Negligible

Table 2-11 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site 1

NVSR	Baseline noise level dB $L_{Aeq}$	Enabling works		Piling works		Pile caps and foundations		Buried utilities/civils' works	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R1	63	58	Negligible	59	Negligible	59	Negligible	57	Negligible
R3	60	55	Negligible	56	Negligible	56	Negligible	55	Negligible
R4	67	49	Negligible	51	Negligible	51	Negligible	49	Negligible
R5	55	42	Negligible	48	Negligible	48	Negligible	41	Negligible
R6	55	48	Negligible	48	Negligible	48	Negligible	41	Negligible
R10	55	45	Negligible	45	Negligible	45	Negligible	38	Negligible
R80	48	48	Negligible	48	Negligible	48	Negligible	41	Negligible
R81	50	47	Negligible	47	Negligible	47	Negligible	41	Negligible
R194	57	47	Negligible	53	Negligible	54	Negligible	45	Negligible

**Table 2-12 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site 2**

NVSR	Baseline noise level dB $L_{Aeq}$	Steel frame building and cladding install		Site-wide MEICA install – process plant		Site roads works	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R1	63	58	Negligible	58	Negligible	57	Negligible
R3	60	55	Negligible	55	Negligible	55	Negligible
R4	67	50	Negligible	50	Negligible	49	Negligible
R5	55	48	Negligible	48	Negligible	41	Negligible
R6	55	48	Negligible	48	Negligible	42	Negligible
R10	55	45	Negligible	45	Negligible	44	Negligible
R80	48	48	Negligible	48	Negligible	42	Negligible
R81	50	47	Negligible	47	Negligible	46	Negligible
R194	57	47	Negligible	47	Negligible	46	Negligible

**Table 2-13 Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site 1**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Piling works		Buried utilities/civils' works		Pile caps and foundations		Buried utilities/civils' works	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	62	Negligible	63	Minor	63	Minor	62	Negligible
R11 - Old Mill house	63	54	Negligible	56	Negligible	56	Negligible	54	Negligible
R73 - Allotments at James Road	52	41	Negligible	48	Negligible	48	Negligible	40	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	40	Negligible	42	Negligible	48	Negligible	39	Negligible
R75 - Bidbury Infant and Junior School	55	44	Negligible	51	Negligible	51	Negligible	43	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	42	Negligible	48	Negligible	48	Negligible	41	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	39	Negligible	46	Negligible	46	Negligible	39	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	45	Negligible	45	Negligible	45	Negligible	38	Negligible
R160 - Church of St Thomas	57	54	Negligible	54	Negligible	55	Negligible	54	Negligible
R163 - Bedhampton Community Centre	57	47	Negligible	49	Negligible	49	Negligible	46	Negligible
R165 - Broadmarsh Coastal Park	55	64	Moderate	65	Major	65	Major	63	Moderate
R215 - Bedhampton Methodist Church	58	48	Negligible	48	Negligible	49	Negligible	42	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	51	Negligible	51	Negligible	51	Negligible	45	Negligible

**Table 2-14 Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site 2**

NVSr	Baseline noise level dB $L_{Aeq,T}$	Steel frame building and cladding install		Site-wide MEICA install – process plant		Site roads works	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	63	Minor	63	Minor	62	Negligible
R11 - Old Mill house	63	55	Negligible	55	Negligible	54	Negligible
R73 - Allotments at James Road	52	41	Negligible	41	Negligible	40	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	41	Negligible	41	Negligible	40	Negligible
R75 - Bidbury Infant and Junior School	55	50	Negligible	50	Negligible	44	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	48	Negligible	48	Negligible	41	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	45	Negligible	45	Negligible	39	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	45	Negligible	45	Negligible	39	Negligible
R160 - Church of St Thomas	57	54	Negligible	54	Negligible	54	Negligible
R163 - Bedhampton Community Centre	57	48	Negligible	48	Negligible	46	Negligible
R165 - Broadmarsh Coastal Park	55	64	Moderate	64	Moderate	63	Moderate
R215 - Bedhampton Methodist Church	58	48	Negligible	48	Negligible	48	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	51	Negligible	51	Negligible	45	Negligible

*Pipelines between the Water Recycling Plant site and Bedhampton Springs*

- 2.3.20 The results of the construction noise level calculations for activities relevant to the section for the Pipelines between the WRP site and Bedhampton Springs are presented in Table 2-15 to Table 2-24.
- 2.3.21 According to the construction programme, TBM shaft construction works within the WRP site are scheduled to overlap with trenchless shaft construction works related to Bedhampton Spring and Budds Farm, and subsequently with the pipe jacking operations.
- 2.3.22 The predictions therefore account for the following scenarios:
1. Compound construction
  2. Compound operation
  3. Trenchless crossing – pipe installation
  4. Bedhampton Springs, WRP site and Budds farm – shaft construction
  5. Bedhampton Springs – pipe jacking and TBM shaft construction

**Table 2-15 Predicted daytime construction noise levels at residential receptors - Water Recycling Plant and Bedhampton Spring 1**

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Compound - Construction			Compound - Operation			Trenchless crossing - Pipe installation		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	66	75	> SOAEL	Major	54	< LOAEL	Negligible	76	> SOAEL	Major
R3	62	66	> LOAEL & < SOAEL	Moderate	53	< LOAEL	Negligible	67	> LOAEL & < SOAEL	Moderate
R4	68	61	< LOAEL	Negligible	60	< LOAEL	Negligible	64	< LOAEL	Negligible
R5	54	45	< LOAEL	Negligible	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R6	54	46	< LOAEL	Negligible	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R10	54	42	< LOAEL	Negligible	43	< LOAEL	Negligible	45	< LOAEL	Negligible
R80	53	46	< LOAEL	Negligible	46	< LOAEL	Negligible	49	< LOAEL	Negligible
R81	55	44	< LOAEL	Negligible	45	< LOAEL	Negligible	47	< LOAEL	Negligible
R194	59	58	< LOAEL	Negligible	52	< LOAEL	Negligible	60	< LOAEL	Minor

**Table 2-16 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant and Bedhampton Spring 2**

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Bedhampton Spring, WRP site and Budds farm (shafts construction)			Bedhampton Spring - Pipejacking		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	66	73	> LOAEL & < SOAEL	Moderate	75	> SOAEL	Major
R3	62	65	> LOAEL & < SOAEL	Moderate	66	> LOAEL & < SOAEL	Moderate
R4	68	63	< LOAEL	Negligible	64	< LOAEL	Negligible
R5	54	51	< LOAEL	Negligible	48	< LOAEL	Negligible
R6	54	52	< LOAEL	Negligible	49	< LOAEL	Negligible
R10	54	49	< LOAEL	Negligible	46	< LOAEL	Negligible
R80	53	52	< LOAEL	Negligible	49	< LOAEL	Negligible
R81	55	51	< LOAEL	Negligible	48	< LOAEL	Negligible
R194	59	59	< LOAEL	Negligible	60	< LOAEL	Minor

Table 2-17 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Spring 1

NVSr	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Compound - Construction			Compound - Operation			Trenchless crossing - Pipe installation		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	58	< LOAEL	Negligible	58	< LOAEL	Negligible	61	< LOAEL	Negligible
R11 - Old Mill house	63	66	> LOAEL & < SOAEL	Minor	52	< LOAEL	Negligible	66	> LOAEL & < SOAEL	Minor
R73 - Allotments at James Road	52	47	< LOAEL	Negligible	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	45	< LOAEL	Negligible	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	55	49	< LOAEL	Negligible	49	< LOAEL	Negligible	52	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	45	< LOAEL	Negligible	46	< LOAEL	Negligible	48	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	44	< LOAEL	Negligible	44	< LOAEL	Negligible	46	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	42	< LOAEL	Negligible	43	< LOAEL	Negligible	45	< LOAEL	Negligible
R160 - Church of St Thomas	57	59	< LOAEL	Negligible	52	< LOAEL	Negligible	60	< LOAEL	Minor
R163 - Bedhampton Community Centre	57	59	< LOAEL	Negligible	57	< LOAEL	Negligible	50	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	55	60	< LOAEL	Minor	58	< LOAEL	Negligible	65	> LOAEL & < SOAEL	Moderate
R215 - Bedhampton Methodist Church	58	45	< LOAEL	Negligible	46	< LOAEL	Negligible	49	< LOAEL	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	52	< LOAEL	Negligible	49	< LOAEL	Negligible	54	< LOAEL	Negligible

**Table 2-18 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Spring 2**

NVSr	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Bedhampton Spring, WRP site and Budds farm (shafts construction)			Bedhampton Spring - Pipejacking		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	66	> LOAEL & < SOAEL	Minor	62	< LOAEL	Negligible
R11 - Old Mill house	63	66	> LOAEL & < SOAEL	Minor	65	< LOAEL	Negligible
R73 - Allotments at James Road	52	50	< LOAEL	Negligible	48	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	50	< LOAEL	Negligible	48	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	55	54	< LOAEL	Negligible	52	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	51	< LOAEL	Negligible	48	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	49	< LOAEL	Negligible	46	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	49	< LOAEL	Negligible	46	< LOAEL	Negligible
R160 - Church of St Thomas	57	60	< LOAEL	Minor	60	< LOAEL	Minor
R163 - Bedhampton Community Centre	57	59	< LOAEL	Negligible	50	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	55	70	> LOAEL & < SOAEL	Moderate	65	> LOAEL & < SOAEL	Moderate
R215 - Bedhampton Methodist Church	58	52	< LOAEL	Negligible	49	< LOAEL	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	55	< LOAEL	Negligible	54	< LOAEL	Negligible

**Table 2-19 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs 1**

NVSr	Baseline noise level dB <i>L</i> <sub>Aeq,T</sub>	Compound construction		Compound operation		Trenchless crossing - Pipe installation	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Magnitude of impact
R1	63	75	Major	54	Negligible	76	Major
R3	60	66	Major	53	Negligible	67	Major
R4	67	61	Negligible	60	Negligible	64	Negligible
R5	55	45	Negligible	46	Negligible	48	Negligible
R6	55	46	Negligible	46	Negligible	48	Negligible
R10	55	42	Negligible	43	Negligible	45	Negligible
R80	48	46	Negligible	46	Negligible	49	Negligible
R81	50	44	Negligible	45	Negligible	47	Negligible
R194	57	58	Minor	52	Negligible	60	Moderate

**Table 2-20 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs 2**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Bedhampton Spring, WRP site and Budds farm (shaft construction)		Bedhampton Spring - Pipejacking	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R1	63	73	Major	75	Major
R3	60	65	Major	66	Major
R4	67	63	Negligible	64	Negligible
R5	55	51	Negligible	48	Negligible
R6	55	52	Negligible	49	Negligible
R10	55	49	Negligible	46	Negligible
R80	48	52	Minor	49	Negligible
R81	50	51	Minor	48	Negligible
R194	57	59	Minor	60	Moderate

**Table 2-21 Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site and Bedhampton Springs 1**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound construction		Compound operation		Trenchless crossing - Pipe installation	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	58	Negligible	58	Negligible	61	Negligible
R11 - Old Mill house	63	66	Moderate	52	Negligible	66	Moderate
R73 - Allotments at James Road	52	47	Negligible	46	Negligible	48	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	45	Negligible	46	Negligible	48	Negligible
R75 - Bidbury Infant and Junior School	55	49	Negligible	49	Negligible	52	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	45	Negligible	46	Negligible	48	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	44	Negligible	44	Negligible	46	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	42	Negligible	43	Negligible	45	Negligible
R160 - Church of St Thomas	57	59	Minor	52	Negligible	60	Moderate
R163 - Bedhampton Community Centre	57	59	Minor	57	Minor	50	Negligible
R165 - Broadmarsh Coastal Park	55	60	Moderate	58	Moderate	65	Major
R215 - Bedhampton Methodist Church	58	45	Negligible	46	Negligible	49	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	52	Negligible	49	Negligible	54	Minor

**Table 2-22 Predicted evenings and weekends construction noise levels at non-residential receptors – Water Recycling Plant site and Bedhampton Springs 2**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Bedhampton Spring, WRP site and Budds farm (shafts construction)		Bedhampton Spring - Pipejacking	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	63	66	Moderate	62	Negligible
R11 - Old Mill house	63	66	Moderate	65	Minor
R73 - Allotments at James Road	52	50	Negligible	48	Negligible
R74 - Allotments adjacent to Bidbury Infant School	52	50	Negligible	48	Negligible
R75 - Bidbury Infant and Junior School	55	54	Negligible	52	Negligible
R76 - St Thomas More's Roman Catholic Primary School	55	51	Negligible	48	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	52	49	Negligible	46	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	52	49	Negligible	46	Negligible
R160 - Church of St Thomas	57	60	Moderate	60	Moderate
R163 - Bedhampton Community Centre	57	59	Minor	50	Negligible
R165 - Broadmarsh Coastal Park	55	70	Major	65	Major
R215 - Bedhampton Methodist Church	58	52	Negligible	49	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	54	55	Minor	54	Minor

**Table 2-23 Predicted night-time construction noise levels at residential receptors – Water Recycling Plant site and Bedhampton Springs**

NVSR	Baseline noise level dB $L_{Aeq,11:00pm\ to\ 7:00am}$	Trenchless crossing - Microtunnelling (Night)			TBM Tunnelling - Night (WRP site)		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R1	58	49	< LOAEL	Negligible	51	< LOAEL	Negligible
R3	54	45	< LOAEL	Negligible	46	< LOAEL	Negligible
R4	62	44	< LOAEL	Negligible	43	< LOAEL	Negligible
R5	45	37	< LOAEL	Negligible	35	< LOAEL	Negligible
R6	45	38	< LOAEL	Negligible	36	< LOAEL	Negligible
R10	45	36	< LOAEL	Negligible	34	< LOAEL	Negligible
R80	35	38	< LOAEL	Negligible	37	< LOAEL	Negligible
R81	35	38	< LOAEL	Negligible	35	< LOAEL	Negligible
R194	54	41	< LOAEL	Negligible	40	< LOAEL	Negligible

**Table 2-24 Predicted night-time construction noise levels at non-residential receptors – Water Recycling Plant and Bedhampton Springs**

NVSr	Baseline noise level dB $L_{Aeq,11:00pm}$ to 7:00am	Trenchless crossing - Microtunnelling (Night)			TBM Tunnelling - Night (WRP site)		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R2 - Broadmarsh Business and Innovation Centre	58	57	< LOAEL	Negligible	49	< LOAEL	Negligible
R11 - Old Mill house	58	42	< LOAEL	Negligible	49	< LOAEL	Negligible
R73 - Allotments at James Road	42	37	< LOAEL	Negligible	34	< LOAEL	Negligible
R74 - Allotments adjacent to Bidbury Infant School	42	36	< LOAEL	Negligible	34	< LOAEL	Negligible
R75 - Bidbury Infant and Junior School	45	40	< LOAEL	Negligible	38	< LOAEL	Negligible
R76 - St Thomas More's Roman Catholic Primary School	45	37	< LOAEL	Negligible	36	< LOAEL	Negligible
R77 - Playing fields adjacent to St Thomas Mores RC School	42	35	< LOAEL	Negligible	33	< LOAEL	Negligible
R78 - Havant Rugby Club and adjacent playing fields [Hooks Lane Recreation Ground]	42	35	< LOAEL	Negligible	33	< LOAEL	Negligible
R160 - Church of St Thomas	54	44	< LOAEL	Negligible	43	< LOAEL	Negligible
R163 - Bedhampton Community Centre	54	42	< LOAEL	Negligible	40	< LOAEL	Negligible
R165 - Broadmarsh Coastal Park	46	62	> SOAEL	Major	49	> LOAEL & < SOAEL	Moderate
R215 - Bedhampton Methodist Church	39	38	< LOAEL	Negligible	37	< LOAEL	Negligible
R221 - Bedhampton Mariners Cricket Club and adjacent playing fields [Bidbury Mead Recreation Ground]	51	40	< LOAEL	Negligible	40	< LOAEL	Negligible

*Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works*

2.3.23 The results of the construction noise level calculations for activities relevant to the section for the Pipeline between the WRP site and Otterbourne WSW are presented in Table 2-25 to Table 2-36.

2.3.24 The predictions account for the following scenarios:

1. Above Ground Plant – Enabling works
2. Above Ground Plant – Mechanical and electrical installation
3. Compound – Construction
4. Compound – Operation
5. Trenchless crossing – Pipe installation
6. Trenchless crossing – Shaft construction
7. Trenchless crossing – Micro-tunnelling
8. Road crossing
9. Pipeline – Construction

Table 2-25 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R12 - Brooklands Farmhouse	41	-	-	-	-	-	-	58	< LOAEL	N/A*
R16	64	-	-	-	-	-	-	62	< LOAEL	Negligible
R17	64	-	-	-	-	-	-	60	< LOAEL	Negligible
R18	47	-	-	-	-	-	-	55	< LOAEL	Negligible
R19	41	57	< LOAEL	Negligible	60	< LOAEL	Minor	68	> LOAEL & < SOAEL	N/A*
R20	56	61	< LOAEL	Minor	64	< LOAEL	Minor	60	< LOAEL	N/A*
R21	41	43	< LOAEL	Negligible	44	< LOAEL	Negligible	37	< LOAEL	N/A*
R22	62	53	< LOAEL	Negligible	56	< LOAEL	Negligible	66	> LOAEL & < SOAEL	N/A*
R23	41	-	-	-	-	-	-	58	< LOAEL	N/A*
R24	58	-	-	-	-	-	-	59	< LOAEL	N/A*
R25	56	-	-	-	-	-	-	50	< LOAEL	N/A*
R26	72	-	-	-	-	-	-	53	< LOAEL	N/A*
R28	56	-	-	-	-	-	-	59	< LOAEL	N/A*
R29	56	-	-	-	-	-	-	57	< LOAEL	N/A*
R30	56	-	-	-	-	-	-	55	< LOAEL	N/A*
R31	56	-	-	-	-	-	-	56	< LOAEL	N/A*
R32	55	-	-	-	-	-	-	49	< LOAEL	N/A*
R33	53	-	-	-	-	-	-	63	< LOAEL	N/A*
R34	53	-	-	-	-	-	-	50	< LOAEL	N/A*
R37	72	48	< LOAEL	Negligible	51	< LOAEL	Negligible	51	< LOAEL	N/A*
R38	59	50	< LOAEL	Negligible	53	< LOAEL	Negligible	52	< LOAEL	N/A*
R39	63	39	< LOAEL	Negligible	42	< LOAEL	Negligible	71	> LOAEL & < SOAEL	N/A*
R40	52	36	< LOAEL	Negligible	40	< LOAEL	Negligible	57	< LOAEL	N/A*
R41	48	47	< LOAEL	Negligible	48	< LOAEL	Negligible	69	> LOAEL & < SOAEL	N/A*
R42	52	36	< LOAEL	Negligible	40	< LOAEL	Negligible	53	< LOAEL	N/A*
R43	51	34	< LOAEL	Negligible	38	< LOAEL	Negligible	57	< LOAEL	N/A*
R44	65	37	< LOAEL	Negligible	40	< LOAEL	Negligible	61	< LOAEL	N/A*
R46	52	48	< LOAEL	Negligible	50	< LOAEL	Negligible	60	< LOAEL	N/A*
R47	41	48	< LOAEL	Negligible	49	< LOAEL	Negligible	54	< LOAEL	N/A*
R48	47	48	< LOAEL	Negligible	49	< LOAEL	Negligible	60	< LOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R49	46	71	> LOAEL & < SOAEL	Moderate	74	> LOAEL & < SOAEL	Moderate	68	> LOAEL & < SOAEL	N/A*
R51	41	65	> LOAEL & < SOAEL	Moderate	67	> LOAEL & < SOAEL	Moderate	65	> LOAEL & < SOAEL	N/A*
R52 - Little Park Mansions	45	64	< LOAEL	Minor	66	> LOAEL & < SOAEL	Moderate	62	< LOAEL	N/A*
R53	54	56	< LOAEL	Negligible	59	< LOAEL	Negligible	69	> LOAEL & < SOAEL	N/A*
R54	64	48	< LOAEL	Negligible	52	< LOAEL	Negligible	71	> LOAEL & < SOAEL	N/A*
R55	64	-	-	-	-	-	-	69	> LOAEL & < SOAEL	N/A*
R56	43	-	-	-	-	-	-	61	< LOAEL	N/A*
R57	45	-	-	-	-	-	-	60	< LOAEL	N/A*
R58	64	49	< LOAEL	Negligible	53	< LOAEL	Negligible	59	< LOAEL	N/A*
R59	56	-	-	-	-	-	-	66	> LOAEL & < SOAEL	N/A*
R60	64	-	-	-	-	-	-	68	> LOAEL & < SOAEL	N/A*
R61	50	-	-	-	-	-	-	55	< LOAEL	N/A*
R62	45	-	-	-	-	-	-	57	< LOAEL	N/A*
R63	56	-	-	-	-	-	-	56	< LOAEL	N/A*
R64	56	61	< LOAEL	Minor	64	< LOAEL	Minor	59	< LOAEL	N/A*
R65	50	-	-	-	-	-	-	52	< LOAEL	N/A*
R66	41	-	-	-	-	-	-	74	> LOAEL & < SOAEL	N/A*
R68	57	-	-	-	-	-	-	66	> LOAEL & < SOAEL	N/A*
R69	57	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*
R70	57	-	-	-	-	-	-	73	> LOAEL & < SOAEL	N/A*
R83	52	35	< LOAEL	Negligible	39	< LOAEL	Negligible	49	< LOAEL	N/A*
R84	50	46	< LOAEL	Negligible	47	< LOAEL	Negligible	44	< LOAEL	N/A*
R86	55	-	-	-	-	-	-	60	< LOAEL	N/A*
R87	60	-	-	-	-	-	-	46	< LOAEL	N/A*
R88	60	-	-	-	-	-	-	49	< LOAEL	N/A*
R89	73	-	-	-	-	-	-	68	< LOAEL	N/A*
R90	53	-	-	-	-	-	-	60	< LOAEL	N/A*
R92	73	-	-	-	-	-	-	59	< LOAEL	N/A*
R93	48	-	-	-	-	-	-	72	> LOAEL & < SOAEL	N/A*
R94	44	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R95	45	-	-	-	-	-	-	48	< LOAEL	N/A*
R96	58	-	-	-	-	-	-	44	< LOAEL	N/A*
R97	47	-	-	-	-	-	-	53	< LOAEL	N/A*
R98	71	-	-	-	-	-	-	52	< LOAEL	N/A*
R99	71	-	-	-	-	-	-	52	< LOAEL	N/A*
R100	71	-	-	-	-	-	-	59	< LOAEL	N/A*
R101	71	-	-	-	-	-	-	65	< LOAEL	N/A*
R102	41	-	-	-	-	-	-	53	< LOAEL	N/A*
R103	41	-	-	-	-	-	-	61	< LOAEL	N/A*
R104	56	-	-	-	-	-	-	71	> LOAEL & < SOAEL	N/A*
R105	56	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*
R106	46	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*
R107	46	-	-	-	-	-	-	63	< LOAEL	N/A*
R108	49	-	-	-	-	-	-	57	< LOAEL	N/A*
R109	56	41	< LOAEL	Negligible	45	< LOAEL	Negligible	60	< LOAEL	N/A*
R110	46	-	-	-	-	-	-	61	< LOAEL	N/A*
R111	56	-	-	-	-	-	-	55	< LOAEL	N/A*
R112	41	42	< LOAEL	Negligible	45	< LOAEL	Negligible	59	< LOAEL	N/A*
R114	41	68	> LOAEL & < SOAEL	Moderate	71	> LOAEL & < SOAEL	Moderate	67	> LOAEL & < SOAEL	N/A*
R115	55	45	< LOAEL	Negligible	47	< LOAEL	Negligible	51	< LOAEL	N/A*
R116	55	47	< LOAEL	Negligible	49	< LOAEL	Negligible	51	< LOAEL	N/A*
R117	61	44	< LOAEL	Negligible	46	< LOAEL	Negligible	49	< LOAEL	N/A*
R118	73	-	-	-	-	-	-	62	< LOAEL	N/A*
R119	73	-	-	-	-	-	-	63	< LOAEL	N/A*
R120	73	-	-	-	-	-	-	60	< LOAEL	N/A*
R121	46	-	-	-	-	-	-	54	< LOAEL	N/A*
R122	41	-	-	-	-	-	-	54	< LOAEL	N/A*
R123	57	-	-	-	-	-	-	51	< LOAEL	N/A*
R125	58	-	-	-	-	-	-	56	< LOAEL	N/A*
R126	55	-	-	-	-	-	-	51	< LOAEL	N/A*
R127	62	-	-	-	-	-	-	61	< LOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R128	53	-	-	-	-	-	-	69	> LOAEL & < SOAEL	N/A*
R129	53	-	-	-	-	-	-	70	> LOAEL & < SOAEL	N/A*
R130	53	-	-	-	-	-	-	69	> LOAEL & < SOAEL	N/A*
R131	53	-	-	-	-	-	-	61	< LOAEL	N/A*
R132	48	-	-	-	-	-	-	61	< LOAEL	N/A*
R133	60	-	-	-	-	-	-	58	< LOAEL	N/A*
R134	65	-	-	-	-	-	-	45	< LOAEL	N/A*
R135	43	-	-	-	-	-	-	52	< LOAEL	N/A*
R136	50	-	-	-	-	-	-	59	< LOAEL	N/A*
R137	49	-	-	-	-	-	-	57	< LOAEL	N/A*
R139	58	-	-	-	-	-	-	57	< LOAEL	N/A*
R140	48	-	-	-	-	-	-	67	> LOAEL & < SOAEL	Moderate
R141	44	-	-	-	-	-	-	66	> LOAEL & < SOAEL	Moderate
R142	62	-	-	-	-	-	-	72	> LOAEL & < SOAEL	Moderate
R144	71	-	-	-	-	-	-	61	< LOAEL	Negligible
R145	62	-	-	-	-	-	-	64	< LOAEL	Minor
R146	48	-	-	-	-	-	-	61	< LOAEL	Minor
R147	56	-	-	-	-	-	-	65	> LOAEL & < SOAEL	Moderate
R148	51	-	-	-	-	-	-	58	< LOAEL	N/A*
R149 - Otterbourne Manor	53	-	-	-	-	-	-	57	< LOAEL	N/A*
R150	61	-	-	-	-	-	-	54	< LOAEL	N/A*
R151	59	-	-	-	-	-	-	61	< LOAEL	N/A*
R152	59	-	-	-	-	-	-	62	< LOAEL	N/A*
R154	59	-	-	-	-	-	-	56	< LOAEL	N/A*
R155	51	-	-	-	-	-	-	57	< LOAEL	Negligible
R156	59	-	-	-	-	-	-	57	< LOAEL	N/A*
R167	62	38	< LOAEL	Negligible	41	< LOAEL	Negligible	60	< LOAEL	N/A*
R168	72	41	< LOAEL	Negligible	48	< LOAEL	Negligible	41	< LOAEL	N/A*
R169	53	66	> LOAEL & < SOAEL	Moderate	69	> LOAEL & < SOAEL	Moderate	63	< LOAEL	N/A*
R170	59	-	-	-	-	-	-	45	< LOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R171	59	-	-	-	-	-	-	45	< LOAEL	N/A*
R172	44	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	Moderate	62	< LOAEL	N/A*
R173	56	-	-	-	-	-	-	51	< LOAEL	N/A*
R174	51	-	-	-	-	-	-	51	< LOAEL	N/A*
R175	61	-	-	-	-	-	-	47	< LOAEL	N/A*
R177	52	34	< LOAEL	Negligible	42	< LOAEL	Negligible	36	< LOAEL	N/A*
R178	61	-	-	-	-	-	-	61	< LOAEL	N/A*
R179	59	-	-	-	-	-	-	61	< LOAEL	N/A*
R180	57	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*
R181	57	-	-	-	-	-	-	63	< LOAEL	N/A*
R182	41	-	-	-	-	-	-	66	> LOAEL & < SOAEL	N/A*
R184	71	-	-	-	-	-	-	57	< LOAEL	N/A*
R185	71	-	-	-	-	-	-	49	< LOAEL	N/A*
R186	50	-	-	-	-	-	-	58	< LOAEL	N/A*
R187	41	-	-	-	-	-	-	56	< LOAEL	N/A*
R188	57	-	-	-	-	-	-	52	< LOAEL	N/A*
R189	44	-	-	-	-	-	-	54	< LOAEL	N/A*
R190	68	39	< LOAEL	Negligible	47	< LOAEL	Negligible	43	< LOAEL	N/A*
R191	55	-	-	-	-	-	-	62	< LOAEL	N/A*
R192	41	-	-	-	-	-	-	58	< LOAEL	N/A*
R193	56	-	-	-	-	-	-	52	< LOAEL	N/A*
R195	41	-	-	-	-	-	-	52	< LOAEL	N/A*
R196	56	-	-	-	-	-	-	52	< LOAEL	N/A*
R197	51	-	-	-	-	-	-	56	< LOAEL	N/A*
R198	41	53	< LOAEL	Negligible	54	< LOAEL	Negligible	49	< LOAEL	N/A*
R199	41	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	Moderate	63	< LOAEL	N/A*
R212	69	44	< LOAEL	Negligible	47	< LOAEL	Negligible	44	< LOAEL	N/A*
R213	51	-	-	-	-	-	-	48	< LOAEL	N/A*
R214	54	57	< LOAEL	Negligible	58	< LOAEL	Negligible	55	< LOAEL	N/A*
R270	56	-	-	-	-	-	-	53	< LOAEL	N/A*
R271	62	46	< LOAEL	Negligible	48	< LOAEL	Negligible	47	< LOAEL	N/A*
R272	57	-	-	-	-	-	-	67	> LOAEL & < SOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant - Enabling works			Above Ground Plant - Mechanical and electrical installation			Compound – Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R273	41	69	> LOAEL & < SOAEL	Moderate	71	> LOAEL & < SOAEL	Moderate	65	> LOAEL & < SOAEL	N/A*
R274	51	-	-	-	-	-	-	49	< LOAEL	N/A*

\*N/A as compound construction works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable to this activity.

Table 2-26 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R12 - Brooklands Farmhouse	41	49	< LOAEL	Negligible	-	-	-	58	< LOAEL	Negligible
R16	64	32	< LOAEL	Negligible	63	< LOAEL	Negligible	62	< LOAEL	Negligible
R17	64	39	< LOAEL	Negligible	62	< LOAEL	Negligible	60	< LOAEL	Negligible
R18	47	38	< LOAEL	Negligible	56	< LOAEL	Negligible	55	< LOAEL	Negligible
R19	41	16	< LOAEL	Negligible	71	> LOAEL & < SOAEL	Moderate	68	Between LOAEL & SOAEL	Moderate
R20	56	27	< LOAEL	Negligible	61	< LOAEL	Minor	60	< LOAEL	Minor
R21	41	29	< LOAEL	Negligible	35	< LOAEL	Negligible	37	< LOAEL	Negligible
R22	62	34	< LOAEL	Negligible	50	< LOAEL	Negligible	66	Between LOAEL & SOAEL	Moderate
R23	41	0	< LOAEL	Negligible	-	-	-	58	< LOAEL	Negligible
R24	58	0	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R25	56	51	< LOAEL	Negligible	-	-	-	50	< LOAEL	Negligible
R26	72	28	< LOAEL	Negligible	-	-	-	53	< LOAEL	Negligible
R28	56	31	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R29	56	32	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible
R30	56	35	< LOAEL	Negligible	-	-	-	55	< LOAEL	Negligible
R31	56	37	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R32	55	37	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R33	53	63	< LOAEL	Minor	-	-	-	63	< LOAEL	Minor
R34	53	50	< LOAEL	Negligible	-	-	-	50	< LOAEL	Negligible
R37	72	47	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R38	59	46	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R39	63	72	> LOAEL & < SOAEL	N/A*	-	-	-	71	Between LOAEL & SOAEL	Moderate
R40	52	59	< LOAEL	N/A*	-	-	-	57	< LOAEL	Negligible
R41	48	68	> LOAEL & < SOAEL	Moderate	-	-	-	69	Between LOAEL & SOAEL	Moderate
R42	52	55	< LOAEL	N/A*	-	-	-	53	< LOAEL	Negligible
R43	51	60	< LOAEL	N/A*	-	-	-	57	< LOAEL	Negligible
R44	65	62	< LOAEL	Negligible	-	-	-	61	< LOAEL	Negligible
R46	52	61	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R47	41	55	< LOAEL	Negligible	-	-	-	54	< LOAEL	Negligible
R48	47	60	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R49	46	50	< LOAEL	Negligible	-	-	-	68	Between LOAEL & SOAEL	Moderate
R51	41	51	< LOAEL	Negligible	-	-	-	65	Between LOAEL & SOAEL	Moderate
R52 - Little Park Mansions	45	53	< LOAEL	Negligible	-	-	-	62	< LOAEL	Minor
R53	54	63	< LOAEL	Minor	-	-	-	69	Between LOAEL & SOAEL	Moderate
R54	64	71	> LOAEL & < SOAEL	Moderate	-	-	-	71	Between LOAEL & SOAEL	Moderate
R55	64	69	> LOAEL & < SOAEL	Moderate	-	-	-	69	Between LOAEL & SOAEL	Moderate
R56	43	62	< LOAEL	Minor	-	-	-	61	< LOAEL	Minor
R57	45	61	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R58	64	61	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R59	56	43	< LOAEL	Negligible	-	-	-	66	Between LOAEL & SOAEL	Moderate
R60	64	50	< LOAEL	Negligible	-	-	-	68	Between LOAEL & SOAEL	Moderate
R61	50	46	< LOAEL	Negligible	-	-	-	55	< LOAEL	Negligible
R62	45	60	< LOAEL	Minor	-	-	-	57	< LOAEL	Negligible
R63	56	45	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R64	56	49	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R65	50	48	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R66	41	73	> LOAEL & < SOAEL	Moderate	-	-	-	74	Between LOAEL & SOAEL	Moderate
R68	57	67	> LOAEL & < SOAEL	Moderate	-	-	-	66	Between LOAEL & SOAEL	Moderate
R69	57	70	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R70	57	76	> SOAEL	Major	-	-	-	73	Between LOAEL & SOAEL	Moderate
R83	52	51	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R84	50	46	< LOAEL	Negligible	-	-	-	44	< LOAEL	Negligible
R86	55	61	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R87	60	37	< LOAEL	Negligible	-	-	-	46	< LOAEL	Negligible
R88	60	38	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R89	73	69	< LOAEL	Negligible	-	-	-	68	< LOAEL	Negligible
R90	53	61	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R92	73	60	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R93	48	75	> SOAEL	Major	-	-	-	72	Between LOAEL & SOAEL	Moderate
R94	44	68	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R95	45	51	< LOAEL	Negligible	-	-	-	48	< LOAEL	Negligible
R96	58	43	< LOAEL	Negligible	-	-	-	44	< LOAEL	Negligible
R97	47	41	< LOAEL	Negligible	-	-	-	53	< LOAEL	Negligible
R98	71	55	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R99	71	53	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R100	71	61	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R101	71	69	< LOAEL	Negligible	-	-	-	65	< LOAEL	Negligible
R102	41	48	< LOAEL	Negligible	-	-	-	53	< LOAEL	Negligible
R103	41	48	< LOAEL	Negligible	-	-	-	61	< LOAEL	Minor
R104	56	72	> LOAEL & < SOAEL	Moderate	-	-	-	71	Between LOAEL & SOAEL	Moderate
R105	56	58	< LOAEL	Negligible	-	-	-	67	Between LOAEL & SOAEL	Moderate
R106	46	67	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R107	46	63	< LOAEL	Minor	-	-	-	63	< LOAEL	Minor

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R108	49	41	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible
R109	56	60	< LOAEL	Minor	-	-	-	60	< LOAEL	Minor
R110	46	53	< LOAEL	Negligible	-	-	-	61	< LOAEL	Minor
R111	56	56	< LOAEL	Negligible	-	-	-	55	< LOAEL	Negligible
R112	41	59	< LOAEL	Negligible	-	-	-	59	< LOAEL	Negligible
R114	41	41	< LOAEL	Negligible	-	-	-	67	Between LOAEL & SOAEL	Moderate
R115	55	35	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R116	55	47	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R117	61	32	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R118	73	40	< LOAEL	Negligible	-	-	-	62	< LOAEL	Negligible
R119	73	39	< LOAEL	Negligible	-	-	-	63	< LOAEL	Negligible
R120	73	39	< LOAEL	Negligible	-	-	-	60	< LOAEL	Negligible
R121	46	39	< LOAEL	Negligible	-	-	-	54	< LOAEL	Negligible
R122	41	35	< LOAEL	Negligible	-	-	-	54	< LOAEL	Negligible
R123	57	41	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R125	58	34	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R126	55	37	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R127	62	62	< LOAEL	N/A*	-	-	-	61	< LOAEL	Negligible
R128	53	69	> LOAEL & < SOAEL	Moderate	-	-	-	69	Between LOAEL & SOAEL	Moderate
R129	53	56	< LOAEL	Negligible	-	-	-	70	Between LOAEL & SOAEL	Moderate
R130	53	58	< LOAEL	Negligible	-	-	-	69	Between LOAEL & SOAEL	Moderate
R131	53	48	< LOAEL	Negligible	-	-	-	61	< LOAEL	Minor
R132	48	55	< LOAEL	Negligible	-	-	-	61	< LOAEL	Minor
R133	60	51	< LOAEL	Negligible	-	-	-	58	< LOAEL	Negligible
R134	65	48	< LOAEL	Negligible	-	-	-	45	< LOAEL	Negligible
R135	43	53	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R136	50	60	< LOAEL	N/A*	-	-	-	59	< LOAEL	Negligible
R137	49	58	< LOAEL	N/A*	-	-	-	57	< LOAEL	Negligible
R139	58	57	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R140	48	65	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R141	44	69	> LOAEL & < SOAEL	Moderate	-	-	-	66	Between LOAEL & SOAEL	Moderate
R142	62	61	< LOAEL	Negligible	-	-	-	72	Between LOAEL & SOAEL	Moderate
R144	71	60	< LOAEL	Negligible	-	-	-	61	< LOAEL	Negligible
R145	62	65	> LOAEL & < SOAEL	Moderate	-	-	-	64	< LOAEL	Minor
R146	48	57	< LOAEL	Negligible	-	-	-	61	< LOAEL	Minor
R147	56	67	> LOAEL & < SOAEL	Moderate	-	-	-	65	Between LOAEL & SOAEL	Moderate
R148	51	56	< LOAEL	Negligible	-	-	-	58	< LOAEL	Negligible
R149 - Otterbourne Manor	53	48	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible
R150	61	49	< LOAEL	Negligible	-	-	-	54	< LOAEL	Negligible
R151	59	62	< LOAEL	Minor	-	-	-	61	< LOAEL	Minor
R152	59	63	< LOAEL	Minor	-	-	-	62	< LOAEL	Minor
R154	59	58	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R155	51	58	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible
R156	59	60	< LOAEL	Minor	-	-	-	57	< LOAEL	Negligible
R167	62	62	< LOAEL	Minor	-	-	-	60	< LOAEL	Negligible
R168	72	32	< LOAEL	Negligible	39	< LOAEL	Negligible	41	< LOAEL	Negligible
R169	53	50	< LOAEL	Negligible	-	-	-	63	< LOAEL	Minor
R170	59	36	< LOAEL	Negligible	-	-	-	45	< LOAEL	Negligible
R171	59	36	< LOAEL	Negligible	-	-	-	45	< LOAEL	Negligible
R172	44	50	< LOAEL	Negligible	-	-	-	62	< LOAEL	Minor
R173	56	51	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R174	51	49	< LOAEL	Negligible	-	-	-	51	< LOAEL	Negligible
R175	61	47	< LOAEL	Negligible	-	-	-	47	< LOAEL	Negligible
R177	52	30	< LOAEL	Negligible	42	< LOAEL	Negligible	36	< LOAEL	Negligible
R178	61	63	< LOAEL	Minor	-	-	-	61	< LOAEL	Minor
R179	59	63	< LOAEL	Minor	-	-	-	61	< LOAEL	Minor
R180	57	70	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R181	57	64	< LOAEL	Minor	-	-	-	63	< LOAEL	Minor

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Trenchless Crossing – Microtunnelling (Day)			Tunnel Shaft Construction			Compound - Operation		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R182	41	65	> LOAEL & < SOAEL	Moderate	-	-	-	66	Between LOAEL & SOAEL	Moderate
R184	71	60	< LOAEL	Negligible	-	-	-	57	< LOAEL	Negligible
R185	71	50	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R186	50	60	< LOAEL	Minor	-	-	-	58	< LOAEL	Negligible
R187	41	57	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R188	57	54	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R189	44	56	< LOAEL	Negligible	-	-	-	54	< LOAEL	Negligible
R190	68	46	< LOAEL	Negligible	-	-	-	43	< LOAEL	Negligible
R191	55	61	< LOAEL	Minor	-	-	-	62	< LOAEL	Minor
R192	41	58	< LOAEL	Negligible	-	-	-	58	< LOAEL	Negligible
R193	56	41	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R195	41	53	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R196	56	46	< LOAEL	Negligible	-	-	-	52	< LOAEL	Negligible
R197	51	47	< LOAEL	Negligible	-	-	-	56	< LOAEL	Negligible
R198	41	47	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible
R199	41	48	< LOAEL	Negligible	-	-	-	63	< LOAEL	Minor
R212	69	44	< LOAEL	Negligible	-	-	-	44	< LOAEL	Negligible
R213	51	29	< LOAEL	Negligible	-	-	-	48	< LOAEL	Negligible
R214	54	30	< LOAEL	Negligible	57	< LOAEL	Negligible	55	< LOAEL	Negligible
R270	56	0	< LOAEL	Negligible	-	-	-	53	< LOAEL	Negligible
R271	62	44	< LOAEL	Negligible	-	-	-	47	< LOAEL	Negligible
R272	57	70	> LOAEL & < SOAEL	Moderate	-	-	-	67	Between LOAEL & SOAEL	Moderate
R273	41	46	< LOAEL	Negligible	-	-	-	65	Between LOAEL & SOAEL	Moderate
R274	51	37	< LOAEL	Negligible	-	-	-	49	< LOAEL	Negligible

\*N/A as microtunnelling works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable. This analysis has only been undertaken for those activities which otherwise would result in a potential likely significant effect (i.e. moderate or major impact).

Table 2-27 Predicted daytime construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 3

NVSr	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R12 - Brooklands Farmhouse	41	59	< LOAEL	49	< LOAEL	Negligible	64	< LOAEL	62	< LOAEL
R16	64	41	< LOAEL	35	< LOAEL	Negligible	-	-	-	-
R17	64	46	< LOAEL	40	< LOAEL	Negligible	-	-	-	-
R18	47	44	< LOAEL	39	< LOAEL	Negligible	-	-	-	-
R19	41	25	< LOAEL	19	< LOAEL	Negligible	59	< LOAEL	-	-
R20	56	35	< LOAEL	29	< LOAEL	Negligible	54	< LOAEL	-	-
R21	41	36	< LOAEL	31	< LOAEL	Negligible	37	< LOAEL	-	-
R22	62	40	< LOAEL	34	< LOAEL	Negligible	59	< LOAEL	65	> LOAEL & < SOAEL
R23	41	0	< LOAEL	-	-	Negligible	67	> LOAEL & < SOAEL	60	< LOAEL
R24	58	0	< LOAEL	-	-	Negligible	64	< LOAEL	63	< LOAEL
R25	56	57	< LOAEL	52	< LOAEL	Negligible	65	> LOAEL & < SOAEL	64	< LOAEL
R26	72	35	< LOAEL	29	< LOAEL	Negligible	64	< LOAEL	58	< LOAEL
R28	56	38	< LOAEL	32	< LOAEL	Negligible	68	> LOAEL & < SOAEL	62	< LOAEL
R29	56	39	< LOAEL	33	< LOAEL	Negligible	64	< LOAEL	63	< LOAEL
R30	56	42	< LOAEL	36	< LOAEL	Negligible	65	> LOAEL & < SOAEL	58	< LOAEL
R31	56	45	< LOAEL	39	< LOAEL	Negligible	62	< LOAEL	64	< LOAEL
R32	55	44	< LOAEL	38	< LOAEL	Negligible	-	-	-	-
R33	53	70	> LOAEL & < SOAEL	64	< LOAEL	Minor	67	> LOAEL & < SOAEL	60	< LOAEL
R34	53	57	< LOAEL	51	< LOAEL	Negligible	-	-	-	-
R37	72	52	< LOAEL	47	< LOAEL	Negligible	55	< LOAEL	-	-
R38	59	50	< LOAEL	46	< LOAEL	Negligible	61	< LOAEL	-	-
R39	63	78	> SOAEL	72	> LOAEL & < SOAEL	Moderate	74	> LOAEL & < SOAEL	-	-
R40	52	64	< LOAEL	59	< LOAEL	Negligible	66	> LOAEL & < SOAEL	56	< LOAEL
R41	48	76	> SOAEL	70	> LOAEL & < SOAEL	Moderate	69	> LOAEL & < SOAEL	-	-
R42	52	60	< LOAEL	55	< LOAEL	Negligible	60	< LOAEL	-	-
R43	51	64	< LOAEL	60	< LOAEL	Minor	63	< LOAEL	-	-
R44	65	68	> LOAEL & < SOAEL	62	< LOAEL	Negligible	64	< LOAEL	-	-
R46	52	67	> LOAEL & < SOAEL	61	< LOAEL	Minor	65	> LOAEL & < SOAEL	61	< LOAEL
R47	41	61	< LOAEL	56	< LOAEL	Negligible	62	< LOAEL	-	-

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R48	47	67	> LOAEL & < SOAEL	61	< LOAEL	Minor	65	> LOAEL & < SOAEL	60	< LOAEL
R49	46	58	< LOAEL	50	< LOAEL	Negligible	80	> SOAEL	-	-
R51	41	59	< LOAEL	51	< LOAEL	Negligible	73	> LOAEL & < SOAEL	76	> SOAEL
R52 - Little Park Mansions	45	65	> LOAEL & < SOAEL	54	< LOAEL	Negligible	72	> LOAEL & < SOAEL	-	-
R53	54	76	> SOAEL	69	> LOAEL & < SOAEL	Moderate	76	> SOAEL	-	-
R54	64	77	> SOAEL	71	> LOAEL & < SOAEL	Moderate	71	> LOAEL & < SOAEL	-	-
R55	64	76	> SOAEL	70	> LOAEL & < SOAEL	Moderate	66	> LOAEL & < SOAEL	-	-
R56	43	68	> LOAEL & < SOAEL	63	< LOAEL	Minor	73	> LOAEL & < SOAEL	60	< LOAEL
R57	45	67	> LOAEL & < SOAEL	62	< LOAEL	Minor	68	> LOAEL & < SOAEL	-	-
R58	64	66	> LOAEL & < SOAEL	61	< LOAEL	Negligible	65	> LOAEL & < SOAEL	-	-
R59	56	52	< LOAEL	46	< LOAEL	Negligible	72	> LOAEL & < SOAEL	75	> SOAEL
R60	64	55	< LOAEL	49	< LOAEL	Negligible	69	> LOAEL & < SOAEL	69	> LOAEL & < SOAEL
R61	50	56	< LOAEL	48	< LOAEL	Negligible	63	< LOAEL	-	-
R62	45	65	> LOAEL & < SOAEL	60	< LOAEL	Minor	68	> LOAEL & < SOAEL	-	-
R63	56	57	< LOAEL	46	< LOAEL	Negligible	73	> LOAEL & < SOAEL	75	> SOAEL
R64	56	60	< LOAEL	49	< LOAEL	Negligible	66	> LOAEL & < SOAEL	-	-
R65	50	57	< LOAEL	48	< LOAEL	Negligible	74	> LOAEL & < SOAEL	74	> LOAEL & < SOAEL
R66	41	80	> SOAEL	76	> SOAEL	Major	72	> LOAEL & < SOAEL	-	-
R68	57	73	> LOAEL & < SOAEL	69	> LOAEL & < SOAEL	Moderate	72	> LOAEL & < SOAEL	-	-
R69	57	74	> LOAEL & < SOAEL	71	> LOAEL & < SOAEL	Moderate	70	> LOAEL & < SOAEL	-	-
R70	57	80	> SOAEL	76	> SOAEL	Major	66	> LOAEL & < SOAEL	-	-
R83	52	56	< LOAEL	51	< LOAEL	Negligible	78	> SOAEL	81	> SOAEL
R84	50	51	< LOAEL	47	< LOAEL	Negligible	73	> LOAEL & < SOAEL	72	> LOAEL & < SOAEL
R86	55	66	> LOAEL & < SOAEL	60	< LOAEL	Minor	63	< LOAEL	-	-
R87	60	49	< LOAEL	39	< LOAEL	Negligible	74	> LOAEL & < SOAEL	76	> SOAEL
R88	60	48	< LOAEL	39	< LOAEL	Negligible	69	> LOAEL & < SOAEL	76	> SOAEL
R89	73	74	> LOAEL & < SOAEL	70	< LOAEL	Negligible	69	< LOAEL	-	-
R90	53	67	> LOAEL & < SOAEL	61	< LOAEL	Minor	66	> LOAEL & < SOAEL	-	-
R92	73	65	< LOAEL	60	< LOAEL	Negligible	64	< LOAEL	-	-

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R93	48	79	> SOAEL	75	> SOAEL	Major	73	> LOAEL & < SOAEL	-	-
R94	44	74	> LOAEL & < SOAEL	69	> LOAEL & < SOAEL	Moderate	72	> LOAEL & < SOAEL	-	-
R95	45	55	< LOAEL	52	< LOAEL	Negligible	69	> LOAEL & < SOAEL	-	-
R96	58	53	< LOAEL	50	< LOAEL	Negligible	71	> LOAEL & < SOAEL	-	-
R97	47	48	< LOAEL	43	< LOAEL	Negligible	82	> SOAEL	72	> LOAEL & < SOAEL
R98	71	59	< LOAEL	55	< LOAEL	Negligible	59	< LOAEL	-	-
R99	71	59	< LOAEL	54	< LOAEL	Negligible	59	< LOAEL	-	-
R100	71	66	< LOAEL	61	< LOAEL	Negligible	64	< LOAEL	-	-
R101	71	72	> LOAEL & < SOAEL	68	< LOAEL	Negligible	69	< LOAEL	-	-
R102	41	56	< LOAEL	54	< LOAEL	Negligible	69	> LOAEL & < SOAEL	58	< LOAEL
R103	41	54	< LOAEL	49	< LOAEL	Negligible	65	> LOAEL & < SOAEL	66	> LOAEL & < SOAEL
R104	56	78	> SOAEL	73	> LOAEL & < SOAEL	Moderate	68	> LOAEL & < SOAEL	-	-
R105	56	68	> LOAEL & < SOAEL	59	< LOAEL	Negligible	69	> LOAEL & < SOAEL	-	-
R106	46	73	> LOAEL & < SOAEL	68	> LOAEL & < SOAEL	Moderate	67	> LOAEL & < SOAEL	-	-
R107	46	69	> LOAEL & < SOAEL	64	< LOAEL	Minor	63	< LOAEL	-	-
R108	49	47	< LOAEL	41	< LOAEL	Negligible	67	> LOAEL & < SOAEL	64	< LOAEL
R109	56	66	> LOAEL & < SOAEL	61	< LOAEL	Minor	64	< LOAEL	-	-
R110	46	62	< LOAEL	59	< LOAEL	Negligible	68	> LOAEL & < SOAEL	-	-
R111	56	61	< LOAEL	57	< LOAEL	Negligible	60	< LOAEL	-	-
R112	41	66	> LOAEL & < SOAEL	60	< LOAEL	Minor	67	> LOAEL & < SOAEL	58	< LOAEL
R114	41	51	< LOAEL	48	< LOAEL	Negligible	71	> LOAEL & < SOAEL	61	< LOAEL
R115	55	46	< LOAEL	37	< LOAEL	Negligible	63	< LOAEL	-	-
R116	55	52	< LOAEL	48	< LOAEL	Negligible	56	< LOAEL	-	-
R117	61	45	< LOAEL	35	< LOAEL	Negligible	55	< LOAEL	-	-
R118	73	47	< LOAEL	41	< LOAEL	Negligible	66	< LOAEL	63	< LOAEL
R119	73	46	< LOAEL	41	< LOAEL	Negligible	69	< LOAEL	63	< LOAEL
R120	73	46	< LOAEL	40	< LOAEL	Negligible	66	< LOAEL	62	< LOAEL
R121	46	47	< LOAEL	41	< LOAEL	Negligible	62	< LOAEL	64	< LOAEL
R122	41	44	< LOAEL	38	< LOAEL	Negligible	63	< LOAEL	68	> LOAEL & < SOAEL

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R123	57	51	< LOAEL	42	< LOAEL	Negligible	66	> LOAEL & < SOAEL	65	> LOAEL & < SOAEL
R125	58	43	< LOAEL	37	< LOAEL	Negligible	62	< LOAEL	60	< LOAEL
R126	55	50	< LOAEL	39	< LOAEL	Negligible	61	< LOAEL	57	< LOAEL
R127	62	68	> LOAEL & < SOAEL	63	< LOAEL	Minor	66	> LOAEL & < SOAEL	-	-
R128	53	72	> LOAEL & < SOAEL	69	> LOAEL & < SOAEL	Moderate	72	> LOAEL & < SOAEL	-	-
R129	53	62	< LOAEL	55	< LOAEL	Negligible	73	> LOAEL & < SOAEL	-	-
R130	53	69	> LOAEL & < SOAEL	58	< LOAEL	Negligible	74	> LOAEL & < SOAEL	-	-
R131	53	62	< LOAEL	49	< LOAEL	Negligible	65	> LOAEL & < SOAEL	-	-
R132	48	63	< LOAEL	61	< LOAEL	Minor	76	> SOAEL	-	-
R133	60	60	< LOAEL	52	< LOAEL	Negligible	63	< LOAEL	-	-
R134	65	52	< LOAEL	48	< LOAEL	Negligible	56	< LOAEL	-	-
R135	43	57	< LOAEL	53	< LOAEL	Negligible	59	< LOAEL	-	-
R136	50	66	> LOAEL & < SOAEL	59	< LOAEL	Negligible	62	< LOAEL	-	-
R137	49	63	< LOAEL	57	< LOAEL	Negligible	67	> LOAEL & < SOAEL	-	-
R139	58	64	< LOAEL	59	< LOAEL	Negligible	68	> LOAEL & < SOAEL	71	> LOAEL & < SOAEL
R140	48	74	> LOAEL & < SOAEL	68	> LOAEL & < SOAEL	Moderate	71	> LOAEL & < SOAEL	55	< LOAEL
R141	44	74	> LOAEL & < SOAEL	69	> LOAEL & < SOAEL	Moderate	70	> LOAEL & < SOAEL	55	< LOAEL
R142	62	79	> SOAEL	62	< LOAEL	Minor	74	> LOAEL & < SOAEL	-	-
R144	71	67	< LOAEL	62	< LOAEL	Negligible	64	< LOAEL	57	< LOAEL
R145	62	71	> LOAEL & < SOAEL	66	> LOAEL & < SOAEL	Moderate	69	> LOAEL & < SOAEL	-	-
R146	48	67	> LOAEL & < SOAEL	62	< LOAEL	Minor	65	> LOAEL & < SOAEL	60	< LOAEL
R147	56	72	> LOAEL & < SOAEL	67	> LOAEL & < SOAEL	Moderate	66	> LOAEL & < SOAEL	-	-
R148	51	65	> LOAEL & < SOAEL	60	< LOAEL	Minor	66	> LOAEL & < SOAEL	62	< LOAEL
R149 - Otterbourne Manor	53	64	< LOAEL	58	< LOAEL	Negligible	66	> LOAEL & < SOAEL	57	< LOAEL
R150	61	61	< LOAEL	56	< LOAEL	Negligible	57	< LOAEL	-	-
R151	59	68	> LOAEL & < SOAEL	63	< LOAEL	Minor	64	< LOAEL	59	< LOAEL
R152	59	69	> LOAEL & < SOAEL	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	58	< LOAEL
R154	59	63	< LOAEL	58	< LOAEL	Negligible	59	< LOAEL	54	< LOAEL
R155	51	64	< LOAEL	58	< LOAEL	Negligible	62	< LOAEL	-	-

NVSR	Baseline noise level dB $L_{Aeq,7:00am to 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R156	59	66	> LOAEL & < SOAEL	61	< LOAEL	Minor	61	< LOAEL	57	< LOAEL
R167	62	67	> LOAEL & < SOAEL	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	-	-
R168	72	40	< LOAEL	34	< LOAEL	Negligible	47	< LOAEL	-	-
R169	53	63	< LOAEL	50	< LOAEL	Negligible	69	> LOAEL & < SOAEL	-	-
R170	59	43	< LOAEL	37	< LOAEL	Negligible	69	> LOAEL & < SOAEL	79	> SOAEL
R171	59	46	< LOAEL	37	< LOAEL	Negligible	69	> LOAEL & < SOAEL	72	> LOAEL & < SOAEL
R172	44	63	< LOAEL	52	< LOAEL	Negligible	68	> LOAEL & < SOAEL	-	-
R173	56	58	< LOAEL	53	< LOAEL	Negligible	69	> LOAEL & < SOAEL	68	> LOAEL & < SOAEL
R174	51	58	< LOAEL	53	< LOAEL	Negligible	65	> LOAEL & < SOAEL	66	> LOAEL & < SOAEL
R175	61	54	< LOAEL	49	< LOAEL	Negligible	35	< LOAEL	57	< LOAEL
R177	52	37	< LOAEL	31	< LOAEL	Negligible	58	< LOAEL	-	-
R178	61	68	> LOAEL & < SOAEL	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	-	-
R179	59	68	> LOAEL & < SOAEL	63	< LOAEL	Minor	65	> LOAEL & < SOAEL	-	-
R180	57	74	> LOAEL & < SOAEL	70	> LOAEL & < SOAEL	Moderate	68	> LOAEL & < SOAEL	-	-
R181	57	70	> LOAEL & < SOAEL	66	> LOAEL & < SOAEL	Moderate	67	> LOAEL & < SOAEL	-	-
R182	41	72	> LOAEL & < SOAEL	66	> LOAEL & < SOAEL	Moderate	64	< LOAEL	-	-
R184	71	65	< LOAEL	61	< LOAEL	Negligible	61	< LOAEL	62	< LOAEL
R185	71	55	< LOAEL	51	< LOAEL	Negligible	59	< LOAEL	-	-
R186	50	65	> LOAEL & < SOAEL	60	< LOAEL	Minor	73	> LOAEL & < SOAEL	-	-
R187	41	63	< LOAEL	57	< LOAEL	Negligible	60	< LOAEL	76	> SOAEL
R188	57	59	< LOAEL	55	< LOAEL	Negligible	57	< LOAEL	-	-
R189	44	61	< LOAEL	56	< LOAEL	Negligible	60	< LOAEL	-	-
R190	68	51	< LOAEL	47	< LOAEL	Negligible	58	< LOAEL	-	-
R191	55	68	> LOAEL & < SOAEL	62	< LOAEL	Minor	76	> SOAEL	-	-
R192	41	65	> LOAEL & < SOAEL	59	< LOAEL	Negligible	68	> LOAEL & < SOAEL	-	-
R193	56	53	< LOAEL	42	< LOAEL	Negligible	71	> LOAEL & < SOAEL	77	> SOAEL
R195	41	59	< LOAEL	54	< LOAEL	Negligible	69	> LOAEL & < SOAEL	79	> SOAEL
R196	56	55	< LOAEL	53	< LOAEL	Negligible	60	< LOAEL	78	> SOAEL
R197	51	62	< LOAEL	56	< LOAEL	Negligible	69	> LOAEL & < SOAEL	59	< LOAEL
R198	41	56	< LOAEL	53	< LOAEL	Negligible	58	< LOAEL	-	-

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Trenchless Crossing – Shaft Construction		Trenchless Crossing – Pipe Installation			Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R199	41	56	< LOAEL	49	< LOAEL	Negligible	65	> LOAEL & < SOAEL	80	> SOAEL
R212	69	48	< LOAEL	44	< LOAEL	Negligible	66	< LOAEL	51	< LOAEL
R213	51	36	< LOAEL	30	< LOAEL	Negligible	67	> LOAEL & < SOAEL	63	< LOAEL
R214	54	37	< LOAEL	31	< LOAEL	Negligible	64	< LOAEL	65	> LOAEL & < SOAEL
R270	56	-	-	-	-	-	62	< LOAEL	78	> SOAEL
R271	62	48	< LOAEL	44	< LOAEL	Negligible	77	> SOAEL	-	-
R272	57	74	> LOAEL & < SOAEL	70	> LOAEL & < SOAEL	Moderate	70	> LOAEL & < SOAEL	-	-
R273	41	54	< LOAEL	46	< LOAEL	Negligible	69	> LOAEL & < SOAEL	-	-
R274	51	44	< LOAEL	39	< LOAEL	Negligible	62	< LOAEL	70	> LOAEL & < SOAEL
R277	60	-	-	-	-	-	-	-	71	> LOAEL & < SOAEL

Table 2-28 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Above Ground Plant – Enabling Works			Above Ground Plant – Mechanical and electrical installation			Compound - Construction		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R35 - Albany Business Centre	72	43	< LOAEL	Negligible	45	< LOAEL	Negligible	45	< LOAEL	N/A*
R36 - Albany Farm Care Home	72	51	< LOAEL	Negligible	54	< LOAEL	Negligible	56	< LOAEL	N/A*
R50 - Kids Love Nature Kindergarten at Wickham	41	64	< LOAEL	Minor	66	> LOAEL & < SOAEL	Moderate	64	< LOAEL	N/A*
R67 - New Place Hotel	52	-	-	-	-	-	-	57	< LOAEL	N/A*
R71 - Christ Church	56	54	< LOAEL	Negligible	56	< LOAEL	Negligible	53	< LOAEL	N/A*
R72 - The George Inn	73	51	< LOAEL	Negligible	53	< LOAEL	Negligible	47	< LOAEL	N/A*
R82 - Church of St Nicholas	56	-	-	-	-	-	-	56	< LOAEL	N/A*
R85 - Site of Wickham Festival	54	-	-	-	-	-	-	63	< LOAEL	N/A*
R91 - The Forge	73	-	-	-	-	-	-	53	< LOAEL	N/A*
R113 - Winters Hill Hall	41	65	> LOAEL & < SOAEL	Moderate	68	> LOAEL & < SOAEL	Moderate	65	> LOAEL & < SOAEL	N/A*
R124 - Wickham allotments	41	54	< LOAEL	Negligible	55	< LOAEL	Negligible	51	< LOAEL	N/A*

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Above Ground Plant – Enabling Works			Above Ground Plant – Mechanical and electrical installation			Compound - Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R138 - Oakwood Lodge Farm Cottages	49	-	-	-	-	-	-	52	< LOAEL	N/A*
R143 - The Brambridge Arms	71	-	-	-	-	-	-	58	< LOAEL	Negligible
R153 - Oakwood Park Recreational Ground, Oakwood Park Play Area and Colden Common Football Club	56	-	-	-	-	-	-	58	< LOAEL	N/A*
R161 - WMD Studios	56	-	-	-	-	-	-	56	< LOAEL	N/A*
R162 - Wickham Park Golf Club	41	41	< LOAEL	Negligible	48	< LOAEL	Negligible	60	< LOAEL	N/A*
R164 - Fort Purbrook Activity Centre	61	-	-	-	-	-	-	54	< LOAEL	Negligible
R166 - The Churchillian Pub	58	52	< LOAEL	Negligible	55	< LOAEL	Negligible	64	< LOAEL	N/A*
R231 - Waterworks Field (including MUGA and play area)	47	-	-	-	-	-	-	48	< LOAEL	N/A*
R232 - Portsmouth Golf Course	41	-	-	-	-	-	-	38	< LOAEL	N/A*
R238 - The Stables Fitness Studio	41	-	-	-	-	-	-	44	< LOAEL	N/A*
R240 - Fareham Barbell Club	45	-	-	-	-	-	-	46	< LOAEL	N/A*
R246 - Play park at Wickham Community Centre	43	-	-	-	-	-	-	47	< LOAEL	N/A*
R247 - Wickham Community Centre	49	-	-	-	-	-	-	51	< LOAEL	N/A*
R249 - Wickham Church Of England Primary School	43	-	-	-	-	-	-	49	< LOAEL	N/A*
R250 - Upper Church Road playground and cricket pitch	49	-	-	-	-	-	-	51	< LOAEL	N/A*
R253 - Meon Valley Golf Course	41	-	-	-	-	-	-	43	< LOAEL	N/A*
R254 - The Black Dog	56	-	-	-	-	-	-	46	< LOAEL	N/A*
R255 - Allotments, football pitch and cricket club off Albany Road	50	-	-	-	-	-	-	44	< LOAEL	N/A*

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Above Ground Plant – Enabling Works			Above Ground Plant – Mechanical and electrical installation			Compound - Construction		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R256 - Play space at Torbay Farm	50	-	-	-	-	-	-	49	< LOAEL	N/A*
R257 - A E Roberts, Woodlea Nurseries	53	-	-	-	-	-	-	50	< LOAEL	N/A*
R258 - The Alma Inn	63	-	-	-	-	-	-	49	< LOAEL	N/A*
R259 - Upham Village Hall	66	-	-	-	-	-	-	46	< LOAEL	N/A*
R263 - Bow Lake Equestrian	46	-	-	-	-	-	-	53	< LOAEL	N/A*
R264 - Fisher's Pond	61	-	-	-	-	-	-	55	< LOAEL	N/A*
R265 - Bright Horizons Fair Oak Day Nurseries and Preschool	53	-	-	-	-	-	-	44	< LOAEL	N/A*
R267 - The Old Forge	59	-	-	-	-	-	-	55	< LOAEL	N/A*
R268 - Brambridge Park Garden Centre	54	-	-	-	-	-	-	50	< LOAEL	N/A*
R269 - Cemetery at Old St Matthew's Church [Ruins]	55	-	-	-	-	-	-	50	< LOAEL	N/A*
R275 - Park place centre	41	62	< LOAEL	Minor	64	< LOAEL	Minor	62	< LOAEL	N/A*
R276 - Wickham Surgery	43	-	-	-	-	-	-	55	< LOAEL	N/A*

\*N/A as compound construction works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable to this activity.

Table 2-29 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2

NVSR	Baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Compound - Operation			Trenchless Crossing – Microtunnelling			TBM – Shaft Construction		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R35 - Albany Business Centre	72	40	< LOAEL	Negligible	41	< LOAEL	Negligible	-	-	-
R36 - Albany Farm Care Home	72	44	< LOAEL	Negligible	47	< LOAEL	Negligible	-	-	-
R50 - Kids Love Nature Kindergarten at Wickham	41	62	< LOAEL	Minor	53	< LOAEL	Negligible	-	-	-
R67 - New Place Hotel	52	55	< LOAEL	Negligible	60	< LOAEL	Minor	-	-	-
R71 - Christ Church	56	53	< LOAEL	Negligible	29	< LOAEL	Negligible	56	< LOAEL	Negligible
R72 - The George Inn	73	49	< LOAEL	Negligible	30	< LOAEL	Negligible	44	< LOAEL	Negligible
R82 - Church of St Nicholas	56	56	< LOAEL	Negligible	37	< LOAEL	Negligible	-	-	-
R85 - Site of Wickham Festival	54	62	< LOAEL	Minor	48	< LOAEL	Negligible	-	-	-
R91 - The Forge	73	52	< LOAEL	Negligible	55	< LOAEL	Negligible	-	-	-

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,7:00am to 7:00pm</sub>	Compound - Operation			Trenchless Crossing – Microtunnelling			TBM – Shaft Construction		
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact
R113 - Winters Hill Hall	41	52	< LOAEL	Negligible	40	< LOAEL	Negligible	-	-	-
R124 - Wickham allotments	41	52	< LOAEL	Negligible	53	< LOAEL	Negligible	-	-	-
R138 - Oakwood Lodge Farm Cottages	49	46	< LOAEL	Negligible	52	< LOAEL	Negligible	-	-	-
R143 - The Brambridge Arms	71	53	< LOAEL	Negligible	58	< LOAEL	Negligible	-	-	-
R153 - Oakwood Park Recreational Ground, Oakwood Park Play Area and Colden Common Football Club	56	55	< LOAEL	Negligible	60	< LOAEL	Minor	-	-	-
R161 - WMD Studios	56	55	< LOAEL	Negligible	31	< LOAEL	Negligible	-	-	-
R162 - Wickham Park Golf Club	41	51	< LOAEL	Negligible	60	< LOAEL	Minor	-	-	-
R164 - Fort Purbrook Activity Centre	61	52	< LOAEL	Negligible	36	< LOAEL	Negligible	56	< LOAEL	Negligible
R166 - The Churchillian Pub	58	62	< LOAEL	Minor	33	< LOAEL	Negligible	50	< LOAEL	Negligible
R231 - Waterworks Field (including MUGA and play area)	47	46	< LOAEL	Negligible	33	< LOAEL	Negligible	50	< LOAEL	Negligible
R232 - Portsmouth Golf Course	41	40	< LOAEL	Negligible	31	< LOAEL	Negligible	42	< LOAEL	Negligible
R238 - The Stables Fitness Studio	41	50	< LOAEL	Negligible	29	< LOAEL	Negligible	-	-	-
R240 - Fareham Barbell Club	45	49	< LOAEL	Negligible	29	< LOAEL	Negligible	-	-	-
R246 - Play park at Wickham Community Centre	43	48	< LOAEL	Negligible	44	< LOAEL	Negligible	-	-	-
R247 - Wickham Community Centre	49	52	< LOAEL	Negligible	47	< LOAEL	Negligible	-	-	-
R249 - Wickham Church Of England Primary School	43	51	< LOAEL	Negligible	53	< LOAEL	Negligible	-	-	-
R250 - Upper Church Road playground and cricket pitch	49	50	< LOAEL	Negligible	53	< LOAEL	Negligible	-	-	-
R253 - Meon Valley Golf Course	41	48	< LOAEL	Negligible	48	< LOAEL	Negligible	-	-	-
R254 - The Black Dog	56	49	< LOAEL	Negligible	49	< LOAEL	Negligible	-	-	-
R255 - Allotments, football pitch and cricket club off Albany Road	50	45	< LOAEL	Negligible	46	< LOAEL	Negligible	-	-	-
R256 - Play space at Torbay Farm	50	48	< LOAEL	Negligible	49	< LOAEL	Negligible	-	-	-
R257 - A E Roberts, Woodlea Nurseries	53	50	< LOAEL	Negligible	51	< LOAEL	Negligible	-	-	-
R258 - The Alma Inn	63	49	< LOAEL	Negligible	39	< LOAEL	Negligible	-	-	-

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Compound - Operation			Trenchless Crossing – Microtunnelling			TBM – Shaft Construction		
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact
R259 - Upham Village Hall	66	47	< LOAEL	Negligible	37	< LOAEL	Negligible	-	-	-
R263 - Bow Lake Equestrian	46	52	< LOAEL	Negligible	55	< LOAEL	Negligible	-	-	-
R264 - Fisher's Pond	61	47	< LOAEL	Negligible	55	< LOAEL	Negligible	-	-	-
R265 - Bright Horizons Fair Oak Day Nurseries and Preschool	53	45	< LOAEL	Negligible	48	< LOAEL	Negligible	-	-	-
R267 - The Old Forge	59	48	< LOAEL	Negligible	56	< LOAEL	Negligible	-	-	-
R268 - Brambridge Park Garden Centre	54	48	< LOAEL	Negligible	52	< LOAEL	Negligible	-	-	-
R269 - Cemetery at Old St Matthew's Church [Ruins]	55	48	< LOAEL	Negligible	51	< LOAEL	Negligible	-	-	-
R275 - Park place centre	41	60	< LOAEL	Minor	52	< LOAEL	Negligible	-	-	-
R276 - Wickham Surgery	43	54	< LOAEL	Negligible	47	< LOAEL	Negligible	-	-	-

Table 2-30 Predicted daytime construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 3

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Trenchless Crossing – Pipe Installation			Trenchless Crossing – Shaft construction		Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R35 - Albany Business Centre	72	42	< LOAEL	Negligible	46	< LOAEL	55	< LOAEL	-	-
R36 - Albany Farm Care Home	72	48	< LOAEL	Negligible	53	< LOAEL	60	< LOAEL	-	-
R50 - Kids Love Nature Kindergarten at Wickham	41	54	< LOAEL	Negligible	65	> LOAEL & < SOAEL	70	> LOAEL & < SOAEL	70	> LOAEL & < SOAEL
R67 - New Place Hotel	52	60	< LOAEL	Minor	64	< LOAEL	61	< LOAEL	-	-
R71 - Christ Church	56	28	< LOAEL	Negligible	34	< LOAEL	56	< LOAEL	-	-
R72 - The George Inn	73	30	< LOAEL	Negligible	36	< LOAEL	53	< LOAEL	-	-
R82 - Church of St Nicholas	56	39	< LOAEL	Negligible	45	< LOAEL	63	< LOAEL	64	< LOAEL
R85 - Site of Wickham Festival	54	49	< LOAEL	Negligible	55	< LOAEL	68	> LOAEL & < SOAEL	78	> SOAEL
R91 - The Forge	73	55	< LOAEL	Negligible	60	< LOAEL	63	< LOAEL	-	-
R113 - Winters Hill Hall	41	48	< LOAEL	Negligible	51	< LOAEL	72	> LOAEL & < SOAEL	62	< LOAEL
R124 - Wickham allotments	41	53	< LOAEL	Negligible	56	< LOAEL	65	> LOAEL & < SOAEL	65	> LOAEL & < SOAEL
R138 - Oakwood Lodge Farm Cottages	49	53	< LOAEL	Negligible	58	< LOAEL	63	< LOAEL	-	-
R143 - The Brambridge Arms	71	60	< LOAEL	Negligible	65	< LOAEL	63	< LOAEL	48	< LOAEL

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Trenchless Crossing – Pipe Installation			Trenchless Crossing – Shaft construction		Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R153 - Oakwood Park Recreational Ground, Oakwood Park Play Area and Colden Common Football Club	56	61	< LOAEL	Minor	66	> LOAEL & < SOAEL	59	< LOAEL	49	< LOAEL
R161 - WMD Studios	56	32	< LOAEL	Negligible	38	< LOAEL	67	> LOAEL & < SOAEL	61	< LOAEL
R162 - Wickham Park Golf Club	41	61	< LOAEL	Minor	67	> LOAEL & < SOAEL	70	> LOAEL & < SOAEL	77	> SOAEL
R164 - Fort Purbrook Activity Centre	61	37	< LOAEL	Negligible	43	< LOAEL	-	-	-	-
R166 - The Churchillian Pub	58	33	< LOAEL	Negligible	38	< LOAEL	64	< LOAEL	64	< LOAEL
R231 - Waterworks Field (including MUGA and play area)	47	34	< LOAEL	Negligible	40	< LOAEL	-	-	-	-
R232 - Portsmouth Golf Course	41	33	< LOAEL	Negligible	42	< LOAEL	-	-	-	-
R238 - The Stables Fitness Studio	41	30	< LOAEL	Negligible	36	< LOAEL	56	< LOAEL	55	< LOAEL
R240 - Fareham Barbell Club	45	30	< LOAEL	Negligible	36	< LOAEL	59	< LOAEL	55	< LOAEL
R246 - Play park at Wickham Community Centre	43	50	< LOAEL	Negligible	53	< LOAEL	58	< LOAEL	-	-
R247 - Wickham Community Centre	49	54	< LOAEL	Negligible	56	< LOAEL	55	< LOAEL	-	-
R249 - Wickham Church Of England Primary School	43	53	< LOAEL	Negligible	56	< LOAEL	66	> LOAEL & < SOAEL	-	-
R250 - Upper Church Road playground and cricket pitch	49	54	< LOAEL	Negligible	58	< LOAEL	67	> LOAEL & < SOAEL	-	-
R253 - Meon Valley Golf Course	41	48	< LOAEL	Negligible	51	< LOAEL	57	< LOAEL	-	-
R254 - The Black Dog	56	50	< LOAEL	Negligible	54	< LOAEL	60	< LOAEL	-	-
R255 - Allotments, football pitch and cricket club off Albany Road	50	46	< LOAEL	Negligible	50	< LOAEL	-	-	-	-
R256 - Play space at Torbay Farm	50	49	< LOAEL	Negligible	52	< LOAEL	60	< LOAEL	-	-
R257 - A E Roberts, Woodlea Nurseries	53	51	< LOAEL	Negligible	54	< LOAEL	60	< LOAEL	-	-
R258 - The Alma Inn	63	40	< LOAEL	Negligible	50	< LOAEL	63	< LOAEL	60	< LOAEL
R259 - Upham Village Hall	66	38	< LOAEL	Negligible	48	< LOAEL	58	< LOAEL	59	< LOAEL
R263 - Bow Lake Equestrian	46	54	< LOAEL	Negligible	59	< LOAEL	56	< LOAEL	-	-
R264 - Fisher's Pond	61	56	< LOAEL	Negligible	61	< LOAEL	57	< LOAEL	-	-
R265 - Bright Horizons Fair Oak Day Nurseries and Preschool	53	48	< LOAEL	Negligible	51	< LOAEL	55	< LOAEL	-	-
R267 - The Old Forge	59	56	< LOAEL	Negligible	62	< LOAEL	62	< LOAEL	55	< LOAEL

NVSR	Baseline noise level dB $L_{Aeq,7:00am}$ to 7:00pm	Trenchless Crossing – Pipe Installation			Trenchless Crossing – Shaft construction		Pipeline -Construction		Road Crossings	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R268 - Brambridge Park Garden Centre	54	52	< LOAEL	Negligible	57	< LOAEL	71	> LOAEL & < SOAEL	-	-
R269 - Cemetery at Old St Matthew's Church [Ruins]	55	52	< LOAEL	Negligible	56	< LOAEL	77	> SOAEL	62	< LOAEL
R275 - Park place centre	41	52	< LOAEL	Negligible	63	< LOAEL	70	> LOAEL & < SOAEL	64	< LOAEL
R276 - Wickham Surgery	43	49	< LOAEL	Negligible	57	< LOAEL	64	< LOAEL	-	-

Table 2-31 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R12 - Brooklands Farmhouse	42	-	-	-	-	58	N/A*	49	Negligible
R16	63	-	-	-	-	62	Negligible	35	Negligible
R17	63	-	-	-	-	60	Negligible	40	Negligible
R18	42	-	-	-	-	55	Moderate	39	Negligible
R19	42	57	Moderate	60	Moderate	68	N/A*	19	Negligible
R20	60	61	Minor	64	Moderate	60	N/A*	29	Negligible
R21	42	43	Negligible	44	Negligible	37	N/A*	31	Negligible
R22	57	53	Negligible	56	Negligible	66	N/A*	34	Negligible
R23	42	-	-	-	-	58	N/A*	0	Negligible
R24	55	-	-	-	-	59	N/A*	0	Negligible
R25	53	-	-	-	-	50	N/A*	52	Negligible
R26	69	-	-	-	-	53	N/A*	29	Negligible
R28	51	-	-	-	-	59	N/A*	32	Negligible
R29	51	-	-	-	-	57	N/A*	33	Negligible
R30	47	-	-	-	-	55	N/A*	36	Negligible
R31	47	-	-	-	-	56	N/A*	39	Negligible
R32	50	-	-	-	-	49	N/A*	38	Negligible
R33	51	-	-	-	-	63	N/A*	64	Moderate
R34	51	-	-	-	-	50	N/A*	51	Minor
R37	68	48	Negligible	51	Negligible	51	N/A*	47	Negligible

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R38	55	50	Negligible	53	Negligible	52	N/A*	46	Negligible
R39	60	39	Negligible	42	Negligible	71	N/A*	72	Major
R40	49	36	Negligible	40	Negligible	57	N/A*	59	Moderate
R41	42	47	Negligible	48	Negligible	69	N/A*	70	Major
R42	47	36	Negligible	40	Negligible	53	N/A*	55	Moderate
R43	48	34	Negligible	38	Negligible	57	N/A*	60	Moderate
R44	62	37	Negligible	40	Negligible	61	N/A*	62	Minor
R46	46	48	Negligible	50	Minor	60	N/A*	61	Moderate
R47	42	48	Negligible	49	Negligible	54	N/A*	56	Moderate
R48	42	48	Negligible	49	Negligible	60	N/A*	61	Moderate
R49	42	71	Major	74	Major	68	N/A*	50	Minor
R51	42	65	Major	67	Major	65	N/A*	51	Minor
R52 - Little Park Mansions	42	64	Moderate	66	Major	62	N/A*	54	Minor
R53	50	56	Moderate	59	Moderate	69	N/A*	69	Major
R54	59	48	Negligible	52	Negligible	71	N/A*	71	Major
R55	59	-	-	-	-	69	N/A*	70	Major
R56	42	-	-	-	-	61	N/A*	63	Moderate
R57	42	-	-	-	-	60	N/A*	62	Moderate
R58	59	49	Negligible	53	Negligible	59	N/A*	61	Minor
R59	51	-	-	-	-	66	N/A*	46	Negligible
R60	59	-	-	-	-	68	N/A*	49	Negligible
R61	45	-	-	-	-	55	N/A*	48	Negligible
R62	42	-	-	-	-	57	N/A*	60	Moderate
R63	52	-	-	-	-	56	N/A*	46	Negligible
R64	51	61	Moderate	64	Moderate	59	N/A*	49	Negligible
R65	46	-	-	-	-	52	N/A*	48	Negligible
R66	42	-	-	-	-	74	N/A*	76	Major
R68	53	-	-	-	-	66	N/A*	69	Major
R69	53	-	-	-	-	67	N/A*	71	Major
R70	53	-	-	-	-	73	N/A*	76	Major
R83	48	35	Negligible	39	Negligible	49	N/A*	51	Minor

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R84	47	46	Negligible	47	Negligible	44	N/A*	47	Negligible
R86	51	-	-	-	-	60	N/A*	60	Moderate
R87	53	-	-	-	-	46	N/A*	39	Negligible
R88	55	-	-	-	-	49	N/A*	39	Negligible
R89	70	-	-	-	-	68	N/A*	70	Minor
R90	48	-	-	-	-	60	N/A*	61	Moderate
R92	70	-	-	-	-	59	N/A*	60	Negligible
R93	44	-	-	-	-	72	N/A*	75	Major
R94	42	-	-	-	-	67	N/A*	69	Major
R95	42	-	-	-	-	48	N/A*	52	Minor
R96	52	-	-	-	-	44	N/A*	50	Negligible
R97	42	-	-	-	-	53	N/A*	43	Negligible
R98	67	-	-	-	-	52	N/A*	55	Negligible
R99	67	-	-	-	-	52	N/A*	54	Negligible
R100	67	-	-	-	-	59	N/A*	61	Negligible
R101	67	-	-	-	-	65	N/A*	68	Minor
R102	42	-	-	-	-	53	N/A*	54	Minor
R103	42	-	-	-	-	61	N/A*	49	Negligible
R104	49	-	-	-	-	71	N/A*	73	Major
R105	49	-	-	-	-	67	N/A*	59	Moderate
R106	42	-	-	-	-	67	N/A*	68	Major
R107	42	-	-	-	-	63	N/A*	64	Moderate
R108	43	-	-	-	-	57	N/A*	41	Negligible
R109	49	41	Negligible	45	Negligible	60	N/A*	61	Moderate
R110	42	-	-	-	-	61	N/A*	59	Moderate
R111	49	-	-	-	-	55	N/A*	57	Moderate
R112	42	42	Negligible	45	Negligible	59	N/A*	60	Moderate
R114	42	68	Major	71	Major	67	N/A*	48	Negligible
R115	49	45	Negligible	47	Negligible	51	N/A*	37	Negligible
R116	49	47	Negligible	49	Negligible	51	N/A*	48	Negligible
R117	56	44	Negligible	46	Negligible	49	N/A*	35	Negligible
R118	69	-	-	-	-	62	N/A*	41	Negligible

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R119	69	-	-	-	-	63	N/A*	41	Negligible
R120	69	-	-	-	-	60	N/A*	40	Negligible
R121	42	-	-	-	-	54	N/A*	41	Negligible
R122	42	-	-	-	-	54	N/A*	38	Negligible
R123	53	-	-	-	-	51	N/A*	42	Negligible
R125	53	-	-	-	-	56	N/A*	37	Negligible
R126	51	-	-	-	-	51	N/A*	39	Negligible
R127	58	-	-	-	-	61	N/A*	63	Moderate
R128	47	-	-	-	-	69	N/A*	69	Major
R129	47	-	-	-	-	70	N/A*	55	Moderate
R130	47	-	-	-	-	69	N/A*	58	Moderate
R131	47	-	-	-	-	61	N/A*	49	Negligible
R132	45	-	-	-	-	61	N/A*	61	Moderate
R133	56	-	-	-	-	58	N/A*	52	Negligible
R134	60	-	-	-	-	45	N/A*	48	Negligible
R135	42	-	-	-	-	52	N/A*	53	Minor
R136	46	-	-	-	-	59	N/A*	59	Moderate
R137	44	-	-	-	-	57	N/A*	57	Moderate
R139	53	-	-	-	-	57	N/A*	59	Moderate
R140	45	-	-	-	-	67	Major	68	Major
R141	42	-	-	-	-	66	Major	69	Major
R142	53	-	-	-	-	72	Major	62	Moderate
R144	59	-	-	-	-	61	Minor	62	Minor
R145	58	-	-	-	-	64	Moderate	66	Major
R146	44	-	-	-	-	61	Moderate	62	Moderate
R147	52	-	-	-	-	65	Major	67	Major
R148	48	-	-	-	-	58	N/A*	60	Moderate
R149 - Otterbourne Manor	52	-	-	-	-	57	N/A*	58	Moderate
R150	57	-	-	-	-	54	N/A*	56	Negligible
R151	52	-	-	-	-	61	N/A*	63	Moderate
R152	52	-	-	-	-	62	N/A*	63	Moderate

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R154	52	-	-	-	-	56	N/A*	58	Moderate
R155	50	-	-	-	-	57	Moderate	58	Moderate
R156	52	-	-	-	-	57	N/A*	61	Moderate
R167	57	38	Negligible	41	Negligible	60	N/A*	63	Moderate
R168	69	41	Negligible	48	Negligible	41	N/A*	34	Negligible
R169	48	66	Major	69	Major	63	N/A*	50	Minor
R170	54	-	-	-	-	45	N/A*	37	Negligible
R171	53	-	-	-	-	45	N/A*	37	Negligible
R172	42	63	Moderate	65	Major	62	N/A*	52	Minor
R173	51	-	-	-	-	51	N/A*	53	Minor
R174	46	-	-	-	-	51	N/A*	53	Minor
R175	56	-	-	-	-	47	N/A*	49	Negligible
R177	49	34	Negligible	42	Negligible	36	N/A*	31	Negligible
R178	56	-	-	-	-	61	N/A*	63	Moderate
R179	54	-	-	-	-	61	N/A*	63	Moderate
R180	53	-	-	-	-	67	N/A*	70	Major
R181	53	-	-	-	-	63	N/A*	66	Major
R182	42	-	-	-	-	66	N/A*	66	Major
R184	67	-	-	-	-	57	N/A*	61	Negligible
R185	67	-	-	-	-	49	N/A*	51	Negligible
R186	45	-	-	-	-	58	N/A*	60	Moderate
R187	42	-	-	-	-	56	N/A*	57	Moderate
R188	52	-	-	-	-	52	N/A*	55	Moderate
R189	42	-	-	-	-	54	N/A*	56	Moderate
R190	65	39	Negligible	47	Negligible	43	N/A*	47	Negligible
R191	50	-	-	-	-	62	N/A*	62	Moderate
R192	42	-	-	-	-	58	N/A*	59	Moderate
R193	50	-	-	-	-	52	N/A*	42	Negligible
R195	42	-	-	-	-	52	N/A*	54	Minor
R196	51	-	-	-	-	52	N/A*	53	Minor
R197	51	-	-	-	-	56	N/A*	56	Moderate
R198	42	53	Minor	54	Minor	49	N/A*	53	Minor

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant - Enabling works		Above Ground Plant - Mechanical and electrical installation		Compound – Construction		Trenchless Crossing – Pipe Installation	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R199	42	63	Moderate	65	Major	63	N/A*	49	Negligible
R212	66	44	Negligible	47	Negligible	44	N/A*	44	Negligible
R213	45	-	-	-	-	48	N/A*	30	Negligible
R214	47	57	Moderate	58	Moderate	55	N/A*	31	Negligible
R270	50	-	-	-	-	53	N/A*	0	Negligible
R271	59	46	Negligible	48	Negligible	47	N/A*	44	Negligible
R272	53	-	-	-	-	67	N/A*	70	Major
R273	42	69	Major	71	Major	65	N/A*	46	Negligible
R274	47	-	-	-	-	49	N/A*	39	Negligible

\*N/A as compound construction works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable to this activity.

**Table 2-32 Predicted evening and weekends construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R12 - Brooklands Farmhouse	42	57	Moderate	49	Negligible	-	-
R16	63	59	Negligible	32	Negligible	63	Negligible
R17	63	58	Negligible	39	Negligible	62	Negligible
R18	42	53	Minor	38	Negligible	56	Moderate
R19	42	66	Major	16	Negligible	71	Major
R20	60	58	Negligible	27	Negligible	61	Minor
R21	42	41	Negligible	29	Negligible	35	Negligible
R22	57	63	Moderate	34	Negligible	50	Negligible
R23	42	56	Moderate	0	Negligible	-	-
R24	55	59	Moderate	0	Negligible	-	-
R25	53	47	Negligible	51	Negligible	-	-
R26	69	53	Negligible	28	Negligible	-	-
R28	51	57	Moderate	31	Negligible	-	-
R29	51	56	Moderate	32	Negligible	-	-
R30	47	54	Minor	35	Negligible	-	-
R31	47	56	Moderate	37	Negligible	-	-
R32	50	51	Minor	37	Negligible	-	-
R33	51	47	Negligible	63	Moderate	-	-

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R34	51	40	Negligible	50	Negligible	-	-
R37	68	43	Negligible	47	Negligible	-	-
R38	55	44	Negligible	46	Negligible	-	-
R39	60	66	Major	72	N/A*	-	-
R40	49	55	Moderate	59	N/A*	-	-
R41	42	48	Negligible	68	Major	-	-
R42	47	50	Minor	55	N/A*	-	-
R43	48	55	Moderate	60	N/A*	-	-
R44	62	58	Negligible	62	Minor	-	-
R46	46	49	Negligible	61	Moderate	-	-
R47	42	47	Negligible	55	Moderate	-	-
R48	42	47	Negligible	60	Moderate	-	-
R49	42	66	Major	50	Minor	-	-
R51	42	63	Moderate	51	Minor	-	-
R52 - Little Park Mansions	42	61	Moderate	53	Minor	-	-
R53	50	67	Major	63	Moderate	-	-
R54	59	62	Minor	71	Major	-	-
R55	59	59	Negligible	69	Major	-	-
R56	42	57	Moderate	62	Moderate	-	-
R57	42	56	Moderate	61	Moderate	-	-
R58	59	58	Negligible	61	Minor	-	-
R59	51	64	Moderate	43	Negligible	-	-
R60	59	66	Major	50	Negligible	-	-
R61	45	54	Minor	46	Negligible	-	-
R62	42	58	Moderate	60	Moderate	-	-
R63	52	57	Moderate	45	Negligible	-	-
R64	51	58	Moderate	49	Negligible	-	-
R65	46	58	Moderate	48	Negligible	-	-
R66	42	58	Moderate	73	Major	-	-
R68	53	62	Moderate	67	Major	-	-
R69	53	65	Major	70	Major	-	-
R70	53	71	Major	76	Major	-	-
R83	48	56	Moderate	51	Minor	-	-

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R84	47	50	Minor	46	Negligible	-	-
R86	51	55	Moderate	61	Moderate	-	-
R87	53	53	Minor	37	Negligible	-	-
R88	55	54	Negligible	38	Negligible	-	-
R89	70	65	Negligible	69	Negligible	-	-
R90	48	56	Moderate	61	Moderate	-	-
R92	70	54	Negligible	60	Negligible	-	-
R93	44	71	Major	75	Major	-	-
R94	42	65	Major	68	Major	-	-
R95	42	52	Minor	51	Minor	-	-
R96	52	53	Minor	43	Negligible	-	-
R97	42	58	Moderate	41	Negligible	-	-
R98	67	52	Negligible	55	Negligible	-	-
R99	67	49	Negligible	53	Negligible	-	-
R100	67	56	Negligible	61	Negligible	-	-
R101	67	63	Negligible	69	Minor	-	-
R102	42	54	Minor	48	Negligible	-	-
R103	42	60	Moderate	48	Negligible	-	-
R104	49	65	Major	72	Major	-	-
R105	49	65	Major	58	Moderate	-	-
R106	42	61	Moderate	67	Major	-	-
R107	42	54	Minor	63	Moderate	-	-
R108	43	55	Moderate	41	Negligible	-	-
R109	49	53	Minor	60	Moderate	-	-
R110	42	59	Moderate	53	Minor	-	-
R111	49	53	Minor	56	Moderate	-	-
R112	42	52	Minor	59	Moderate	-	-
R114	42	53	Minor	41	Negligible	-	-
R115	49	45	Negligible	35	Negligible	-	-
R116	49	46	Negligible	47	Negligible	-	-
R117	56	43	Negligible	32	Negligible	-	-
R118	69	60	Negligible	40	Negligible	-	-
R119	69	61	Negligible	39	Negligible	-	-

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R120	69	58	Negligible	39	Negligible	-	-
R121	42	52	Minor	39	Negligible	-	-
R122	42	53	Minor	35	Negligible	-	-
R123	53	50	Negligible	41	Negligible	-	-
R125	53	53	Minor	34	Negligible	-	-
R126	51	50	Negligible	37	Negligible	-	-
R127	58	54	Negligible	62	N/A*	-	-
R128	47	68	Major	69	Major	-	-
R129	47	68	Major	56	Moderate	-	-
R130	47	67	Major	58	Moderate	-	-
R131	47	60	Moderate	48	Negligible	-	-
R132	45	59	Moderate	55	Moderate	-	-
R133	56	56	Minor	51	Negligible	-	-
R134	60	46	Negligible	48	Negligible	-	-
R135	42	51	Minor	53	Minor	-	-
R136	46	51	Minor	60	N/A*	-	-
R137	44	50	Minor	58	N/A*	-	-
R139	53	53	Minor	57	Moderate	-	-
R140	45	60	Moderate	65	Major	-	-
R141	42	64	Moderate	69	Major	-	-
R142	53	70	Major	61	Moderate	-	-
R144	59	55	Negligible	60	Minor	-	-
R145	58	62	Moderate	65	Major	-	-
R146	44	53	Minor	57	Moderate	-	-
R147	52	62	Moderate	67	Major	-	-
R148	48	53	Minor	56	Moderate	-	-
R149 - Otterbourne Manor	52	46	Negligible	48	Negligible	-	-
R150	57	46	Negligible	49	Negligible	-	-
R151	52	57	Moderate	62	Moderate	-	-
R152	52	56	Moderate	63	Moderate	-	-
R154	52	51	Negligible	58	Moderate	-	-
R155	50	55	Moderate	58	Moderate	-	-
R156	52	55	Moderate	60	Moderate	-	-

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R167	57	58	Minor	62	N/A*	-	-
R168	69	45	Negligible	32	Negligible	39	Negligible
R169	48	62	Moderate	50	Minor	-	-
R170	54	57	Moderate	36	Negligible	-	-
R171	53	51	Negligible	36	Negligible	-	-
R172	42	60	Moderate	50	Minor	-	-
R173	51	52	Minor	51	Minor	-	-
R174	46	48	Negligible	49	Negligible	-	-
R175	56	55	Negligible	47	Negligible	-	-
R177	49	41	Negligible	30	Negligible	42	Negligible
R178	56	59	Moderate	63	Moderate	-	-
R179	54	58	Moderate	63	Moderate	-	-
R180	53	64	Moderate	70	Major	-	-
R181	53	56	Minor	64	Moderate	-	-
R182	42	52	Minor	65	Major	-	-
R184	67	57	Negligible	60	Negligible	-	-
R185	67	47	Negligible	50	Negligible	-	-
R186	45	56	Moderate	60	Moderate	-	-
R187	42	56	Moderate	57	Moderate	-	-
R188	52	52	Minor	54	Minor	-	-
R189	42	51	Minor	56	Moderate	-	-
R190	65	46	Negligible	46	Negligible	-	-
R191	50	43	Negligible	61	Moderate	-	-
R192	42	41	Negligible	58	Moderate	-	-
R193	50	54	Minor	41	Negligible	-	-
R195	42	55	Moderate	53	Minor	-	-
R196	51	54	Minor	46	Negligible	-	-
R197	51	47	Negligible	47	Negligible	-	-
R198	42	51	Minor	47	Negligible	-	-
R199	42	62	Moderate	48	Negligible	-	-
R212	66	43	Negligible	44	Negligible	-	-
R213	45	50	Minor	29	Negligible	-	-
R214	47	56	Moderate	30	Negligible	57	Moderate

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless crossing - Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude	Predicted noise level dB $L_{Aeq,T}$	Impact magnitude
R270	50	55	Moderate	0	Negligible	-	-
R271	59	54	Negligible	44	Negligible	-	-
R272	53	65	Major	70	Major	-	-
R273	42	65	Major	46	Negligible	-	-
R274	47	58	Moderate	37	Negligible	-	-

\*N/A as microtunnelling works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable to this activity. This analysis has only been undertaken for those activities which otherwise would result in a potential likely significant effect (i.e. moderate or major impact).

**Table 2-33 Predicted evening and weekends construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 1**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant – Enabling Works		Above Ground Plant – Mechanical and electrical installation		Compound - Construction		Trenchless crossing – Pipe installation	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R35 - Albany Business Centre	68	43	Negligible	45	Negligible	45	N/A*	42	Negligible
R36 - Albany Farm Care Home	68	51	Negligible	54	Negligible	56	N/A*	48	Negligible
R50 - Kids Love Nature Kindergarten at Wickham	42	64	Moderate	66	Major	64	N/A*	54	Minor
R67 - New Place Hotel	47	-	-	-	-	57	N/A*	60	Moderate
R71 - Christ Church	60	54	Negligible	56	Negligible	53	N/A*	28	Negligible
R72 - The George Inn	69	51	Negligible	53	Negligible	47	N/A*	30	Negligible
R82 - Church of St Nicholas	47	-	-	-	-	56	N/A*	39	Negligible
R85 - Site of Wickham Festival	49	-	-	-	-	63	N/A*	49	Negligible
R91 - The Forge	70	-	-	-	-	53	N/A*	55	Negligible
R113 - Winters Hill Hall	42	65	Major	68	Major	65	N/A*	48	Negligible
R124 - Wickham allotments	42	54	Minor	55	Moderate	51	N/A*	53	Minor
R138 - Oakwood Lodge Farm Cottages	44	-	-	-	-	52	N/A*	53	Minor
R143 - The Brambridge Arms	59	-	-	-	-	58	Negligible	60	Minor
R153 - Oakwood Park Recreational Ground, Oakwood Park Play Area and Colden Common Football Club	49	-	-	-	-	58	N/A*	61	Moderate
R161 - WMD Studios	51	-	-	-	-	56	N/A*	32	Negligible

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant – Enabling Works		Above Ground Plant – Mechanical and electrical installation		Compound - Construction		Trenchless crossing – Pipe installation	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R162 - Wickham Park Golf Club	42	41	Negligible	48	Negligible	60	N/A*	61	Moderate
R164 - Fort Purbrook Activity Centre	60	-	-	-	-	54	Negligible	37	Negligible
R166 - The Churchillian Pub	53	52	Negligible	55	Minor	64	N/A*	33	Negligible
R231 - Waterworks Field (including MUGA and play area)	44	-	-	-	-	48	N/A*	34	Negligible
R232 - Portsmouth Golf Course	42	-	-	-	-	38	N/A*	33	Negligible
R238 - The Stables Fitness Studio	42	-	-	-	-	44	N/A*	30	Negligible
R240 - Fareham Barbell Club	42	-	-	-	-	46	N/A*	30	Negligible
R246 - Play park at Wickham Community Centre	42	-	-	-	-	47	N/A*	50	Minor
R247 - Wickham Community Centre	44	-	-	-	-	51	N/A*	54	Minor
R249 - Wickham Church Of England Primary School	42	-	-	-	-	49	N/A*	53	Minor
R250 - Upper Church Road playground and cricket pitch	44	-	-	-	-	51	N/A*	54	Minor
R253 - Meon Valley Golf Course	42	-	-	-	-	43	N/A*	48	Negligible
R254 - The Black Dog	52	-	-	-	-	46	N/A*	50	Negligible
R255 - Allotments, football pitch and cricket club off Albany Road	44	-	-	-	-	44	N/A*	46	Negligible
R256 - Play space at Torbay Farm	44	-	-	-	-	49	N/A*	49	Negligible
R257 - A E Roberts, Woodlea Nurseries	47	-	-	-	-	50	N/A*	51	Minor
R258 - The Alma Inn	58	-	-	-	-	49	N/A*	40	Negligible
R259 - Upham Village Hall	61	-	-	-	-	46	N/A*	38	Negligible
R263 - Bow Lake Equestrian	42	-	-	-	-	53	N/A*	54	Minor
R264 - Fisher's Pond	57	-	-	-	-	55	N/A*	56	Negligible
R265 - Bright Horizons Fair Oak Day Nurseries and Preschool	49	-	-	-	-	44	N/A*	48	Negligible

NVSR	Baseline noise level dB $L_{Aeq,T}$	Above Ground Plant – Enabling Works		Above Ground Plant – Mechanical and electrical installation		Compound - Construction		Trenchless crossing – Pipe installation	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R267 - The Old Forge	55	-	-	-	-	55	N/A*	56	Minor
R268 - Brambridge Park Garden Centre	53	-	-	-	-	50	N/A*	52	Negligible
R269 - Cemetery at Old St Matthew's Church [Ruins]	53	-	-	-	-	50	N/A*	52	Negligible
R275 - Park place centre	42	62	Moderate	64	Moderate	62	N/A*	52	Minor
R276 - Wickham Surgery	42	-	-	-	-	55	N/A*	49	Negligible

\*N/A as compound construction works at this compound are shorter than one month; hence, magnitude of impact criteria are not applicable to this activity.

**Table 2-34 Predicted evening and weekends construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works 2**

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless Crossing – Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R35 - Albany Business Centre	68	40	Negligible	41	Negligible	-	-
R36 - Albany Farm Care Home	68	44	Negligible	47	Negligible	-	-
R50 - Kids Love Nature Kindergarten at Wickham	42	62	Moderate	53	Minor	-	-
R67 - New Place Hotel	47	55	Moderate	60	Moderate	-	-
R71 - Christ Church	60	53	Negligible	29	Negligible	56	Negligible
R72 - The George Inn	69	49	Negligible	30	Negligible	44	Negligible
R82 - Church of St Nicholas	47	56	Moderate	37	Negligible	-	-
R85 - Site of Wickham Festival	49	62	Moderate	48	Negligible	-	-
R91 - The Forge	70	52	Negligible	55	Negligible	-	-
R113 - Winters Hill Hall	42	52	Minor	40	Negligible	-	-
R124 - Wickham allotments	42	52	Minor	53	Minor	-	-
R138 - Oakwood Lodge Farm Cottages	44	46	Negligible	52	Minor	-	-
R143 - The Brambridge Arms	59	53	Negligible	58	Negligible	-	-
R153 - Oakwood Park Recreational Ground, Oakwood Park Play Area and Colden Common Football Club	49	55	Moderate	60	Moderate	-	-
R161 - WMD Studios	51	55	Moderate	31	Negligible	-	-
R162 - Wickham Park Golf Club	42	51	Minor	60	Moderate	-	-
R164 - Fort Purbrook Activity Centre	60	52	Negligible	36	Negligible	56	Negligible
R166 - The Churchillian Pub	53	62	Moderate	33	Negligible	50	Negligible
R231 - Waterworks Field (including MUGA and play area)	44	46	Negligible	33	Negligible	50	Minor

NVSR	Baseline noise level dB $L_{Aeq,T}$	Compound – Operation		Trenchless Crossing – Microtunnelling		TBM – Shaft Construction	
		Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact
R232 - Portsmouth Golf Course	42	40	Negligible	31	Negligible	42	Negligible
R238 - The Stables Fitness Studio	42	50	Minor	29	Negligible	-	-
R240 - Fareham Barbell Club	42	49	Negligible	29	Negligible	-	-
R246 - Play park at Wickham Community Centre	42	48	Negligible	44	Negligible	-	-
R247 - Wickham Community Centre	44	52	Minor	47	Negligible	-	-
R249 - Wickham Church Of England Primary School	42	51	Minor	53	Minor	-	-
R250 - Upper Church Road playground and cricket pitch	44	50	Minor	53	Minor	-	-
R253 - Meon Valley Golf Course	42	48	Negligible	48	Negligible	-	-
R254 - The Black Dog	52	49	Negligible	49	Negligible	-	-
R255 - Allotments, football pitch and cricket club off Albany Road	44	45	Negligible	46	Negligible	-	-
R256 - Play space at Torbay Farm	44	48	Negligible	49	Negligible	-	-
R257 - A E Roberts, Woodlea Nurseries	47	50	Minor	51	Minor	-	-
R258 - The Alma Inn	58	49	Negligible	39	Negligible	-	-
R259 - Upham Village Hall	61	47	Negligible	37	Negligible	-	-
R263 - Bow Lake Equestrian	42	52	Minor	55	Moderate	-	-
R264 - Fisher's Pond	57	47	Negligible	55	Negligible	-	-
R265 - Bright Horizons Fair Oak Day Nurseries and Preschool	49	45	Negligible	48	Negligible	-	-
R267 - The Old Forge	55	48	Negligible	56	Minor	-	-
R268 - Brambridge Park Garden Centre	53	48	Negligible	52	Negligible	-	-
R269 - Cemetery at Old St Matthew's Church [Ruins]	53	48	Negligible	51	Negligible	-	-
R275 - Park place centre	42	60	Moderate	52	Minor	-	-
R276 - Wickham Surgery	42	54	Minor	47	Negligible	-	-

**Table 2-35 Predicted night-time construction noise levels at residential receptors – Water Recycling Plant to Otterbourne Water Supply Works**

NVSR	Baseline noise level dB $L_{Aeq,11:00pm\ to\ 7:00am}$	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB $L_{Aeq,T}$	Comparison with LOAEL & SOAEL
R12 - Brooklands Farmhouse	35	-	-	-	-	-
R16	55	-	-	-	-	-
R17	55	-	-	-	-	-
R18	35	-	-	-	-	-

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R19	35	-	-	-	-	-
R20	50	-	-	-	-	-
R21	35	-	-	-	-	-
R22	38	-	-	-	-	-
R23	35	-	-	-	-	-
R24	51	-	-	-	61	> SOAEL
R25	46	-	-	-	-	-
R26	35	-	-	-	56	> SOAEL
R28	49	-	-	-	-	-
R29	49	-	-	-	-	-
R30	48	-	-	-	-	-
R31	48	-	-	-	-	-
R32	35	-	-	-	-	-
R33	45	-	-	-	-	-
R34	45	-	-	-	-	-
R37	62	-	-	-	-	-
R38	35	-	-	-	-	-
R39	35	-	-	-	-	-
R40	35	-	-	-	-	-
R41	35	-	-	-	-	-
R42	35	-	-	-	-	-
R43	35	-	-	-	-	-
R44	35	-	-	-	-	-
R46	40	-	-	-	-	-
R47	35	-	-	-	-	-
R48	35	-	-	-	-	-
R49	35	-	-	-	-	-
R51	35	-	-	-	-	-
R52 - Little Park Mansions	35	-	-	-	-	-
R53	43	-	-	-	-	-
R54	54	-	-	-	-	-
R55	54	-	-	-	-	-
R56	35	-	-	-	-	-

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R57	38	-	-	-	-	-
R58	54	-	-	-	-	-
R59	35	-	-	-	-	-
R60	35	-	-	-	-	-
R61	35	-	-	-	-	-
R62	35	-	-	-	-	-
R63	35	-	-	-	-	-
R64	35	-	-	-	-	-
R65	35	-	-	-	-	-
R66	35	73	> SOAEL	Major	-	-
R68	48	66	> SOAEL	Major	-	-
R69	48	68	> SOAEL	Major	-	-
R70	48	74	> SOAEL	Major	-	-
R83	35	-	-	-	-	-
R84	35	-	-	-	-	-
R86	35	59	> SOAEL	Major	-	-
R87	35	-	-	-	59	> SOAEL
R88	35	-	-	-	54	> LOAEL & < SOAEL
R89	65	51	< LOAEL	Moderate	-	-
R90	35	54	> LOAEL & < SOAEL	Moderate	-	-
R92	65	48	< LOAEL	Moderate	-	-
R93	35	72	> SOAEL	Major	-	-
R94	35	64	> SOAEL	Major	-	-
R95	35	-	-	-	-	-
R96	35	-	-	-	-	-
R97	35	-	-	-	-	-
R98	62	-	-	-	-	-
R99	62	-	-	-	-	-
R100	62	-	-	-	-	-
R101	62	-	-	-	-	-
R102	35	-	-	-	-	-
R103	35	-	-	-	-	-
R104	44	-	-	-	-	-

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R105	44	-	-	-	-	-
R106	35	-	-	-	-	-
R107	35	-	-	-	-	-
R108	35	-	-	-	-	-
R109	44	-	-	-	-	-
R110	35	-	-	-	-	-
R111	44	-	-	-	-	-
R112	35	-	-	-	-	-
R114	35	-	-	-	-	-
R115	35	-	-	-	-	-
R116	35	-	-	-	-	-
R117	35	-	-	-	-	-
R118	65	-	-	-	45	< LOAEL
R119	65	-	-	-	52	< LOAEL
R120	65	-	-	-	55	< LOAEL
R121	35	-	-	-	-	-
R122	35	-	-	-	-	-
R123	35	-	-	-	65	> SOAEL
R125	35	-	-	-	-	-
R126	35	-	-	-	56	> SOAEL
R127	35	-	-	-	-	-
R128	40	-	-	-	-	-
R129	40	-	-	-	-	-
R130	40	-	-	-	-	-
R131	40	-	-	-	-	-
R132	35	-	-	-	-	-
R133	35	-	-	-	-	-
R134	35	-	-	-	-	-
R135	35	-	-	-	-	-
R136	35	-	-	-	-	-
R137	44	-	-	-	-	-
R139	35	54	> LOAEL & < SOAEL	Moderate	-	-
R140	40	63	> SOAEL	Major	-	-

NVSR	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R141	35	67	> SOAEL	Major	-	-
R142	45	61	> SOAEL	Major	-	-
R144	55	58	> LOAEL & < SOAEL	Major	-	-
R145	43	61	> SOAEL	Major	-	-
R146	39	54	> LOAEL & < SOAEL	Moderate	-	-
R147	40	64	> SOAEL	Major	-	-
R148	39	54	> LOAEL & < SOAEL	Moderate	-	-
R149 - Otterbourne Manor	47	-	-	-	-	-
R150	50	-	-	-	-	-
R151	47	-	-	-	-	-
R152	47	-	-	-	-	-
R154	47	-	-	-	-	-
R155	43	55	> SOAEL	Major	-	-
R156	47	-	-	-	-	-
R167	41	-	-	-	-	-
R168	65	-	-	-	-	-
R169	35	-	-	-	-	-
R170	35	-	-	-	54	> LOAEL & < SOAEL
R171	35	-	-	-	53	> LOAEL & < SOAEL
R172	39	-	-	-	-	-
R173	35	47	> LOAEL & < SOAEL	Moderate	-	-
R174	35	45	> LOAEL & < SOAEL	Moderate	-	-
R175	35	44	< LOAEL	minor	-	-
R177	46	-	-	-	-	-
R178	35	-	-	-	-	-
R179	35	41	< LOAEL	minor	-	-
R180	48	68	> SOAEL	Major	-	-
R181	48	63	> SOAEL	Major	-	-
R182	35	65	> SOAEL	Major	-	-
R184	62	-	-	-	-	-
R185	62	-	-	-	-	-
R186	35	-	-	-	-	-
R187	35	56	> SOAEL	Major	-	-

NVSr	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossing – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R188	35	51	> LOAEL & < SOAEL	Moderate	-	-
R189	35	54	> LOAEL & < SOAEL	Moderate	-	-
R190	35	-	-	-	-	-
R191	44	-	-	-	-	-
R192	35	-	-	-	-	-
R193	35	-	-	-	-	-
R195	35	50	> LOAEL & < SOAEL	Moderate	-	-
R196	35	-	-	-	-	-
R197	45	-	-	-	-	-
R198	35	-	-	-	-	-
R199	35	-	-	-	-	-
R212	35	-	-	-	-	-
R213	35	-	-	-	-	-
R214	39	-	-	-	-	-
R270	35	-	-	-	-	-
R271	35	-	-	-	-	-
R272	48	68	> SOAEL	Major	-	-
R273	35	-	-	-	-	-
R274	35	-	-	-	69	> SOAEL
R277	38	-	-	-	71	> SOAEL

Table 2-36 Predicted night-time construction noise levels at non-residential receptors – Water Recycling Plant to Otterbourne Water Supply Works

NVSr	Baseline noise level dB <i>L</i> <sub>Aeq,11:00pm to 7:00am</sub>	Trenchless Crossings – Microtunnelling (Night)			Road Crossings (Night)	
		Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL	Magnitude of impact	Predicted noise level dB <i>L</i> <sub>Aeq,T</sub>	Comparison with LOAEL & SOAEL
R67 - New Place Hotel	35	58	> SOAEL	Major	-	-
R91 - The Forge	65	46	< LOAEL	Moderate	-	-
R143 - The Brambridge Arms	55	56	> SOAEL	Major	-	-
R250 - Upper Church Road playground and cricket pitch	35	44	< LOAEL	minor	-	-
R258 - The Alma Inn	35	-	-	-	59	> SOAEL
R259 - Upham Village Hall	35	-	-	-	59	> SOAEL
R268 - Brambridge Park Garden Centre	47	49	> LOAEL & < SOAEL	Moderate	-	-

2.3.25 Sequential construction of compounds H-5 and J-1 could result in month-long impacts; hence, the 26<sup>th</sup> loudest day and magnitude of impact at the relevant receptors have been determined and are provided in Table 2-37.

**Table 2-37 Predicted month long compound construction noise levels at temporary construction compounds H-5 and J-1**

NVSR	Daytime baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Evenings and weekends baseline noise level dB $L_{Aeq,T}$	Compound construction		
			Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact (daytime)	Magnitude of impact (evening and weekends)
R89	73	70	63	Negligible	Negligible
R90	53	48	56	Negligible	Moderate
R91	73	70	50	Negligible	Negligible
R92	73	70	51	Negligible	Negligible
R178	56	56	54	Negligible	Negligible
R179	54	54	60	Minor	Moderate
R186	50	45	55	Negligible	Moderate

2.3.26 Additionally, sequential construction of compounds K-3, K-4 and K-5 could result in month-long impacts; hence, the 26<sup>th</sup> loudest day and magnitude of impact at the relevant receptors have been determined and are provided in Table 2-38.

**Table 2-38 Predicted month long compound construction noise levels at temporary construction compounds K-3, K-4 and K-5**

NVSR	Daytime baseline noise level dB $L_{Aeq,7:00am\ to\ 7:00pm}$	Evenings and weekends baseline noise level dB $L_{Aeq,T}$	Compound construction		
			Predicted noise level dB $L_{Aeq,T}$	Magnitude of impact (daytime)	Magnitude of impact (evening and weekends)
R104	56	49	66	Moderate	Major
R105	56	49	59	Negligible	Moderate
R106	46	42	63	Moderate	Moderate
R107	46	42	58	Negligible	Moderate
R109	56	49	58	Negligible	Moderate
R110	46	42	53	Negligible	Minor
R111	56	49	53	Negligible	Minor
R112	41	42	55	Negligible	Moderate

### 3 Construction ground-borne noise

- 3.1.1 A quantitative assessment of construction ground-borne noise impacts has been undertaken, based on estimates of likely worst case tunnelling noise levels at the closest identified sensitive receptors to the works, using the empirical calculation formula in BS 5228-2. The results of which are included in ES Chapter 15 Noise and vibration, Volume I (Document reference 6.1, DCO Volume 6).
- 3.1.2 There are no UK legislative standards or criteria that define when ground-borne noise becomes significant. The most relevant guidance is in the Association of Noise Consultants ‘Measurement and assessment of ground-borne noise and vibration’ [11] which describes published guidelines for assessing impacts of ground-borne noise, including those published by the American Public Transit Association (APTA) [12]. The APTA guidelines suggest criteria for acceptable maximum levels of ground-borne noise affecting various building types, including a criterion of 35dB  $L_{AMax}$  for ground-borne noise affecting residential properties, during the day or night. This criterion is typically adopted as a LOAEL (as 35dB  $L_{ASmax}$ ) by major infrastructure projects in the UK, with 45dB  $L_{ASMax}$  as the SOAEL.
- 3.1.3 The magnitude of impact criteria for residential receptors are provided in Table 3-1. These criteria are typically applied to permanent ground-borne noise sources, such as new underground railway lines, however in the absence of suitable alternative criteria these will also be applied to the assessment of ground-borne noise during construction.

**Table 3-1 Construction ground-borne noise significant observed adverse effect level and lowest observed adverse effect level for residential receptors**

Magnitude of Impact	Construction ground-borne noise level (dB $L_{ASMax}$ )	Noise Policy Statement England/Planning Practical Guidance on Noise category
Major	More than or equal to 50	-
Moderate	More than or equal to 45 to less than 50	SOAEL is 45dB $L_{ASmax}$
Minor	More than or equal to 35 to less than 45	LOAEL is 35dB $L_{ASmax}$
Negligible	Less than 35	-

- 3.1.4 For the assessment of construction ground-borne noise impacts on non-residential sensitive receptors, indoor noise level criteria have been identified as detailed in Table 3-2. These criteria are typically applied to ground-borne noise from operational sources (underground trains) and higher criteria would typically be applied to construction activities such as tunnel boring; hence, this is a cautious approach.

**Table 3-2 Ground-borne noise criteria for non-residential receptors**

Receptor type	Predicted indoor noise level (dB $L_{ASMax}$ )
Large auditoria, concert halls, theatres and sound recording and broadcast studios	25
Places of meeting for religious worship, courts, cinemas, lecture theatres, museums, hospitals with long-term care wards, small auditoria or halls	35
Offices, schools, colleges, medical centres, hotels, libraries	40

3.1.5 Where the criteria in Table 3-2 are predicted to be exceeded, or where moderate or major impacts are predicted at residential receptors, assessments of significance of effect have considered the additional factors identified in relation to airborne construction noise impacts (paragraph 2.2.12).

## 4 Construction vibration

### 4.1 Assessment methodology

- 4.1.1 Construction vibration impacts are assessed for all activities which are a potentially significant source of vibration, such as tunnelling, piling and vibratory rollers/compactors, where proposed within 100m of any identified potentially sensitive receptors. Impacts are considered for both damage to buildings and annoyance to occupiers.
- 4.1.2 A number of British Standards are available that provide guidance in respect of the measurement and assessment of vibration. With regards to environmental vibration effects the key documents relevant to the Proposed Development are:
1. BS 7385-2:1993 Evaluation and measurement for vibration in buildings - Guide to damage levels from ground-borne vibration Part 2: Guide to damage levels from ground-borne vibration [13], which presents guidance in relation to the effects of vibration on buildings, irrespective of the source, in terms of the peak particle velocity (PPV). PPV is a measure of the absolute maximum vibration levels over a period of time and does not account for duration.
  2. BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting' [14] is concerned with the effects of vibration on humans from any sources except blasting, using the Vibration Dose Value (VDV). VDV accounts for the total amount of time that vibration can occur within specific time periods.
  3. BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration [7] which is for use specifically for the assessment on humans of vibration from construction activities only, using the PPV metric.
- 4.1.3 BS5228-2 is the approved code of practice for control of construction vibration under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. In relation to the appropriate parameter and criteria to use for the assessment of effects on people, BS5228-2 states "*Whilst the assessment of the response to vibration in BS 6472 is based on the VDV and weighted acceleration, for construction it is considered more appropriate to provide guidance in terms of the PPV, since this parameter is likely to be more routinely measured based upon the more usual concern over potential building damage. Furthermore, since many of the empirical vibration predictors yield a result in terms of PPV, it is necessary to understand what the consequences might be of any predicted levels in terms of human perception and disturbance.*"
- 4.1.4 Table 4-1 details PPV vibration levels and provides a semantic scale for the description of construction vibration effects on human receptors, based on guidance contained in BS 5228-2. The guidance does not state whether these relate to continuous or intermittent sources; however, it does state that "*Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance,*

*might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.”*

**Table 4-1 Construction vibration criteria for human receptors (annoyance) using peak particle velocity**

Vibration limit (peak particle velocity) (mm.s <sup>-1</sup> )	Interpreted significance to humans	Magnitude of impact	Noise Policy Statement England/Planning Practical Guidance on Noise category
Less than 0.14	Vibration unlikely to be perceptible	Negligible	
0.14 to less than 0.3	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction		
0.3 to less than 1.0	Vibration might just be perceptible in residential environments	Minor	Lower end of range is equivalent to LOAEL
1.0 to less than 10.0	It is likely that vibration at this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents	Moderate	Lower end of range is equivalent to SOAEL
10.0 or more	Vibration is likely to be intolerable for any more than a brief exposure to this level	Major	

4.1.5 The criteria in Table 4-1 are appropriate to use for the assessment vibration from most construction activities. However, for the assessment of annoyance effects from tunnelling vibration, the VDV metric has been used, as provided in Table 4-2 which is based on guidance contained in BS 6472-1. The VDV has been used to assess tunnelling vibration for the following reasons:

1. There is more representative source emission data available to enable calculations of impacts than that available for the PPV metric.
2. Tunnelling vibration emissions are relatively continuous, with very few peaks in the vibration level; hence, use of PPV is not necessarily representative of effects on humans.
3. Tunnelling would occur at night and BS 6472-1 provides night-time assessment criteria in terms of VDV.

**Table 4-2 Construction vibration criteria for human receptors (annoyance) using Vibration Dose Value**

Vibration level (Vibration Dose Value) ( $\text{mm}\cdot\text{s}^{-1.75}$ )		Magnitude of impact	Noise Policy Statement England/Planning Practical Guidance on Noise category
Day	Night		
Less than 0.4	Less than 0.2	Negligible	
0.4 to less than 0.8	0.2 to less than 0.4	Minor	Lower end of range is equivalent to LOAEL
0.8 to less than 1.6	0.4 to less than 0.8	Moderate	Lower end of range is equivalent to SOAEL
1.6 or higher	0.8 or higher	Major	

4.1.6 Construction vibration effects on humans are considered significant when it is determined that a major magnitude of impact (according to Table 4-1 or Table 4-2) will occur for a duration exceeding one day. In accordance with the Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration Rev 2 [15], where moderate impacts are predicted, effects would be significant where they will occur for a duration exceeding:

1. Ten or more days or nights in any 15 consecutive days or nights
2. A total number of days exceeding 40 in any six consecutive months

4.1.7 The response of a building to ground-borne vibration is affected by the type of foundation, ground conditions, the building construction, and the condition of the building. BS 7385-2 provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2. Guide values for transient vibration in terms of PPV, above which cosmetic damage could occur, are given in Table 4-3.

**Table 4-3 Transient vibration guide values for cosmetic damage**

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hertz (Hz) to 15Hz	15Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 $\text{mm}\cdot\text{s}^{-1}$ at 4Hz and above	
Un-reinforced or light framed structures  Residential or light commercial type buildings	15 $\text{mm}\cdot\text{s}^{-1}$ at 4Hz increasing to 20 $\text{mm}\cdot\text{s}^{-1}$ at 15Hz	20 $\text{mm}\cdot\text{s}^{-1}$ at 15Hz increasing to 50 $\text{mm}\cdot\text{s}^{-1}$ at 40Hz and above

4.1.8 BS 7385-2 states that the probability of building damage tends to zero for transient vibration levels less than 12.5 $\text{mm}\cdot\text{s}^{-1}$  PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.

- 4.1.9 The values in Table 4-3 refer to the likelihood of cosmetic damage. ISO 4866:2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures [16] defines three different categories of building damage:
1. Cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions
  2. Minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block
  3. Major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks
- 4.1.10 BS 7385-2 states that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration level twice that of minor damage. Therefore, this guidance can be used to define the potential impact identified in Table 4-4 for continuous vibration.

**Table 4-4 Construction vibration criteria for assessing building damage**

Magnitude of impact	Damage risk	Continuous vibration level (peak particle velocity) (mm.s <sup>-1</sup> )	Transient vibration level (peak particle velocity) (mm.s <sup>-1</sup> )
Negligible	Negligible	Less than 6	Less than 12
Minor	Cosmetic	6 to less than 15	12 to less than 30
Moderate	Minor	15 to less than 30	30 to less than 60
Major	Major	30	60

- 4.1.11 In order to determine potential impacts vibration from construction sites at the are predicted in terms of the PPV. Empirical calculations were undertaken according to the guidance in Transport and Road Research Laboratory Report 53 [17], Transport Research Laboratory Report (TRL) 429 [18] and BS 5228-2. TRL Report 429 has also been used to identify vibration from tunnelling operations in terms of the VDV.
- 4.1.12 The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and receptor and the activities being undertaken. BS 5228-2 provides data on measured levels of vibration for various construction works under a variety of ground conditions and these will be used where required to supplement the calculations, for example to determine the likelihood of predicted levels occurring, based on real-life examples.
- 4.1.13 Receptor sensitivity to vibration damage impacts is classified as follows:
1. Medium – reinforced or framed structures, industrial and heavy commercial buildings
  2. High – un-reinforced or light framed structures, residential or light commercial type buildings are classified as high
  3. Very High – important structures known to be vulnerable to vibration damage

- 4.1.14 Construction vibration effects on buildings may therefore be considered significant where it is determined that a moderate or major magnitude of impact may occur.
- 4.1.15 The criteria adopted to assess construction vibration impacts are independent of vibration levels; therefore, a baseline vibration survey is not required to inform the construction vibration impact assessment.

## 4.2 Construction vibration predictions

- 4.2.1 For the vibration assessment, a review of the plant required to construct the Proposed Development identified that ground compaction activities had the greatest potential to lead to vibration impacts. Since the need for compaction will be determined by local ground conditions as well as the construction activities being undertaken, it has been assumed that compaction could occur anywhere within the Order Limits. The need for vibratory piling at trenchless crossing compounds cannot be discounted at present; hence, predictions of vibration from vibratory piling have also been undertaken. Construction of the temporary cofferdam at the SDS outfall could require sheet piling, which could involve vibratory and/or percussive piling.
- 4.2.2 Calculations have been undertaken to determine the distances from the piling and compaction works at which the vibration levels are equal to the following criteria in terms of the PPV (taken from ES Chapter 15 Noise and vibration, Volume 1 (Document reference 6.1, DCO Volume 6)):
1. Human disturbance effects:
    - a.  $0.3\text{mm}\cdot\text{s}^{-1}$  (LOAEL)
    - b.  $1.0\text{mm}\cdot\text{s}^{-1}$  (SOAEL)
    - c.  $10\text{mm}\cdot\text{s}^{-1}$
  2. Building damage effects (continuous vibration):
    - a.  $6\text{mm}\cdot\text{s}^{-1}$
    - b.  $15\text{mm}\cdot\text{s}^{-1}$
    - c.  $30\text{mm}\cdot\text{s}^{-1}$
  3. Building damage effects (transient vibration):
    - a.  $12\text{mm}\cdot\text{s}^{-1}$
    - b.  $30\text{mm}\cdot\text{s}^{-1}$
    - c.  $60\text{mm}\cdot\text{s}^{-1}$
- 4.2.3 All vibration emitting activities are considered continuous except percussive piling, which is considered transient. For tunnelling activities, disturbance effects from vibration are considered in terms of the VDV.
- 4.2.4 Vibration levels experienced during construction would be influenced by factors including the number of subsurface layers of soil or rock, the thickness, density and stiffness of these layers, the depth of the water table, the topography of the site and the operating frequency of the plant.
- 4.2.5 The calculations to determine impacts upon humans require an indoor vibration level to be determined; hence a frequency independent vibration transfer function

(level multiplied by 1.8) between outdoors and indoors has been assumed. This is based upon measurements described in the Transport and Road Research Laboratory report 'Ground vibrations from impact pile driving during road construction' [19]. Calculations to determine building damage related impacts are based on the external vibration level on the ground at the building foundations.

### Compaction

- 4.2.6 The ground compaction predictions have been based on the prediction methodology in BS 5228-2 for steady state and start up and run down of vibratory rollers. The assumed equipment a large twin drum roller which is 1.2m wide and the drum vibration amplitude is 0.5mm. This is considered representative of the modern equipment likely to be used for the backfilling works. Whilst rollers with larger vibration amplitudes are available, these would not be required for compacting excavated soil.

### Shaft construction

- 4.2.7 The method for constructing tunnel shafts has not been determined, methods that could be used are segmental lining, secant piling and diaphragm walling, as described in ES Chapter 3 Description of the Proposed Development, Volume I, (Document reference 6.1, DCO Volume 6). Segmental lined shafts are constructed using either open caisson sinking techniques or underpinning. These methods are not expected to require activities or plant that emit levels of vibration that could disturb nearby receptors. Secant piled shaft construction involves the use of a continuous flight auger drilling rig to excavate the pile opening and simultaneously pour concrete. BS5228-2 states "*The levels of vibration associated with continuous flight auger injected piling and pressed-in piling are minimal, as the processes do not involve rapid acceleration or deceleration of tools in contact with the ground but rely to a large extent on steady motions*"; hence, secant piling is not expected to emit levels of vibration that could disturb nearby receptors. Diaphragm walls are constructed using purpose-built grabs or, in appropriate circumstances, milling machines (hydromills), both of which are potential sources of vibration. Diaphragm wall construction vibration emissions were measured in 'Assessment of low vibration techniques in the construction of a diaphragm wall using a hydromill' [20] and compared to published data for these vibration sources. The diaphragm wall grab was shown to emit much higher levels of vibration than the hydromill. Predictions of vibration from the grab have therefore been undertaken using published data taken from 'Transit Noise and Vibration Impact Assessment Manual' [21], which provides a measured PPV level of 5.1 mm.s<sup>-1</sup> at 7.6m, and recommends use of the following equation for predicting levels at alternative distances:

$$PPV_{d2} = PPV_{d1} \times \frac{d_1^{1.5}}{d_2}$$

- 4.2.8 Where:  $PPV_{d2}$  is the vibration level at the distance of interest,  $d2$   
 $PPV_{d1}$  is the specified vibration level at the 7.6m ( $d1$ )

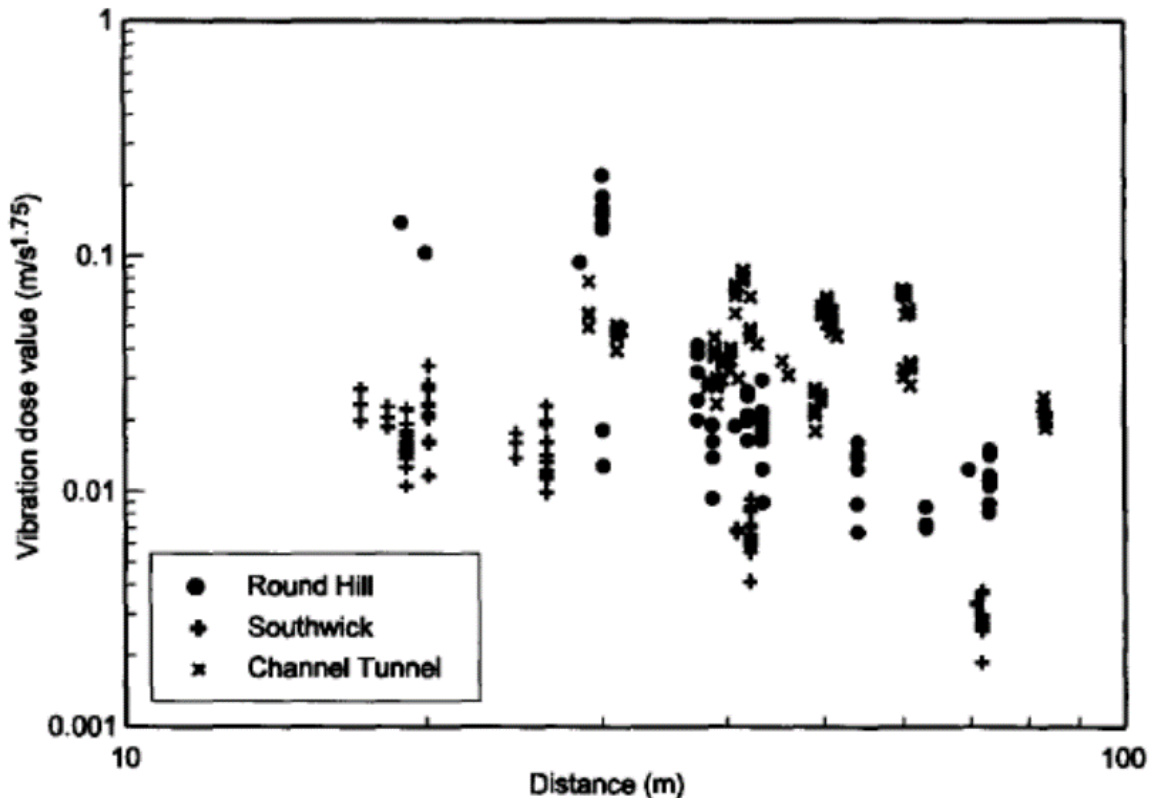
## Trenchless crossings

- 4.2.9 Construction of trenchless crossing pits has the potential to require vibratory piling. The vibratory piling predictions have been based on the prediction methodology in BS 5228-2, incorporating the following parameters:
1.  $\delta=1.3$  (accounting for all operations)
  2. Scaling factor ( $k_v$ ) =266 (5% predicted value being exceeded)
- 4.2.10 The operation of microtunnelling machines is likely to generate similar levels of vibration to rotary bored piling due to the similar mechanisms involved. Table D.6 of BS 5228-2 shows that vibration from rotary bored piling activities is unlikely to exceed  $0.3\text{mm}\cdot\text{s}^{-1}$  at a distance of approximately 20m (measured vibration levels in row 103).
- 4.2.11 The vibration predictions for microtunnelling identified the driving energy of the drill to produce a PPV of  $0.3\text{mm}\cdot\text{s}^{-1}$  at 20m to be 380 kJ. This was used to calculate the distances at which the vibration criteria would occur.

## Tunnelling

- 4.2.12 The maximum diameter of the tunnel between the WRP site and Portsdown Hill is to be 4m. ES Chapter 11 Land quality and ground conditions, Volume I (Document reference 6.1, DCO Volume 6), provides ground conditions across the Proposed Development, and these are understood to be predominantly chalk at the anticipated depth of the tunnel.
- 4.2.13 BS 5228-2 and TRL Report 429 [18] provide reference vibration data and empirical formulae for the prediction of vibration from tunnelling activities. The empirical relationship in TRL Report 429 Equation 24 relates to hard rock ground conditions and large boring machines (up to 10.5m in diameter); hence, it is highly likely to overestimate potential vibration levels due to the proposed tunnelling and has not been used for the assessment of annoyance effects.
- 4.2.14 Figure 47 of TRL Report 429 (replicated in Graphic 4-1) provides calculated VDV for tunnelling operations in chalk sites, from measurements made at three locations during major UK construction projects: Round Hill site (A20), Southwick (A27) and Holywell Coombe (Channel Tunnel). The tunnels depths were between 12m (Southwick) and 22.6 to 55m (Channel Tunnel); these are comparable to the tunnel between the WRP site and Portsdown Hill depth (11 to 27m). This shows that, in all instances, vibration levels were below  $0.3\text{ms}^{-1.75}$ . The Round Hill site shown in Graphic 4-1 comprised a 10.5m high tunnel being constructed as part of the A20 project; hence, this is considered to be an overestimate of potential vibration emissions from the proposed tunnelling. The calculated VDV for the other two projects shown in the figure did not exceed  $0.1\text{ms}^{-1.75}$ . Correcting to an indoor value equates to a likely maximum VDV from tunnelling operations of around  $0.18\text{ms}^{-1.75}$ .

Graphic 4-1 Calculated vibration dose values for tunnelling operations, Transport Research Laboratory 429



4.2.15 Building damage criteria are defined using the PPV parameter; hence, in the absence of an alternative, TRL Report 429 Equation 24 has been used for these calculations. The results of these calculations are provided in Table 4-5. These values are considered highly cautious, TRL Report 429 states that “*in soft ground, this is likely to be excessively conservative and the constant term could reasonably be reduced by an order of magnitude.*”

Table 4-5 Ground-borne vibration set-back distances

Activity	Set-back distance at which vibration impact is predicted to occur for building damage effects (m)		
	Minor	Moderate	Major
Tunnelling	11	6.7	3.9

**Cofferdam construction**

4.2.16 The calculations of vibration emissions from vibratory piling described in relation to trenchless crossings are also applicable to the cofferdam construction. The percussive piling predictions have been based on the prediction methodology in BS 5228-2, incorporating the following parameters:

1. Hammer energy (W) = 72kJ, considered a reasonable worst-case from values in Table D-8 of BS5228-2

2. Ground conditions factor ( $k_p$ ) = 3, equating to piles being driven through hard ground conditions. Whilst piles driven to refusal ( $k_p = 5$ ) would result in higher vibration emissions, the calculation method when using this value is only valid at up to 27m from the works, it is not therefore considered inappropriate to apply to the calculation of impacts at the closest receptor to the cofferdam, which is around 50m away

## References

- [1] Department for Environment, Food and Rural Affairs, “Noise policy statement for England,” 15 March 2010. [Online]. Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf).
- [2] Department for Environment, Food and Rural Affairs, “National Policy Statement for water resources infrastructure,” 2023. [Online]. Available: <https://www.gov.uk/government/publications/national-policy-statement-for-water-resources-infrastructure>.
- [3] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, “Planning Practice Guidance on Noise,” 22 July 2019. [Online]. Available: <https://www.gov.uk/guidance/noise--2>.
- [4] UK Parliament, “Control of Pollution Act,” 1974. [Online]. Available: <https://www.legislation.gov.uk/ukpga/1974/40/contents>.
- [5] UK Parliament, *The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015*, London: The Stationary Office, 2015.
- [6] British Standards Institution, *British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise*, London: BSI, 2014.
- [7] British Standards Institution, *British Standard 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 Vibration*, London: BSI, 2014.
- [8] Anglian Water, *Vol 4: Appendices - Bury St Edmund to Colchester Appendix 9.1 - Noise and Vibration technical Methodology*, Peterborough, 2022.
- [9] Tracto, “MIXING SYSTEMS AND DRILLING FLUID LOGISTICS,” October 2022. [Online]. Available: [https://tracto.com/doks/pdf/Prosp\\_MISCHANLAGEN\\_EN.pdf](https://tracto.com/doks/pdf/Prosp_MISCHANLAGEN_EN.pdf).
- [10] Transport For London, “SilverTown Tunnel Preliminary Environmental information report: Appedix 14.A Construction Noise,” 2015. [Online]. Available: <https://content.tfl.gov.uk/peir-appendix-14a-construction-noise.pdf>.
- [11] Association of Noise Consultants, *Measurement & Assessment of Groundborne Noise & Vibration*, Northallerton: ANC, 2020.
- [12] American Public Transit Association, *Guidelines for Design of Rail Transit Facilities, Section 2-7, “Noise and Vibration”*, Washington: APTA, 1981.
- [13] British Standards Institution, *British Standard 7385-2:2003 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration*, London: BSI, 1993.
- [14] British Standards Institution, *British Standard 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting*, London: BSI, 2008.
- [15] Highways England, “LA 111 Noise and Vibration Revision 2,” May 2020. [Online]. Available: <https://www.standardsforhighways.co.uk/tses/attachments/cc8cfcf7-c235-4052-8d32-d5398796b364?inline=true>.
- [16] International Standards Organization, *ISO 4866: 2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures*, London: ISO, 2010.
- [17] Transport and Road Research Laboratory, *Report 53 Ground Vibration Caused by Civil Engineering Works*, Wokingham: TRRL, 1986.
- [18] Transport Research Laboratory, *Report 429 Groundborne Vibration Caused by Mechanised Construction Works*, Wokingham: TRL, 2000.
- [19] D. J. Martin, *Ground vibrations from impact pile driving during road construction*, Crowthorne: Transport and Road Research Laboratory, 1980.
- [20] D. Prasad, *Assessment of low vibration techniques in the construction of a diaphragm wall using a hydromill*, Birmingham: Institute of Acoustics, 2014, pp. 331-337.

- [21] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Cambridge, MA: Federal Transit Administration Office of Planning and Environment, U.S. Department of Transportation, 2018.



from  
Southern  
Water. 

The logo graphic for Southern Water, featuring three stylized, white, wavy lines that resemble water waves, positioned to the right of the word "Water".