

YG-DCO-043-5.3.14B

# Yorkshire Green Energy Enablement (GREEN) Project

**Volume 5**

**Document 5.3.14B ES Chapter 14 Appendix 14B - Construction Plant and Activity Assumptions**

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**nationalgrid**

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# Contents

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<b>1.</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	Purpose of this Document	1
<b>2.</b>	<b>Reasonable worst case construction phases</b>	<b>2</b>
2.1	Method of determining reasonable worst-case	2
2.2	Overton Substation area	2
2.3	Monk Fryston Substation area	3
2.4	Tadcaster area	3
2.5	Shipton-Tee area	4
<b>3.</b>	<b>Plant assumptions</b>	<b>6</b>

---

Table 3.1 – construct bellmouth / haul road plant assumptions	7
Table 3.2 – establish temporary compound plant assumptions	7
Table 3.3 – establish main compound plant assumptions	8
Table 3.4 – temporary compound use - Overton plant assumptions	8
Table 3.5 – temporary compound use – Monk Fryston plant assumptions	9
Table 3.6 – temporary compound use - Tadcaster plant assumptions	10
Table 3.7 – temporary compound use – Shipton-Tee plant assumptions	11
Table 3.8 – laying foundations for electrical equipment plant assumptions	13
Table 3.9 – troughing / ducting works plant assumptions	13
Table 3.10 – construct control building plant assumptions	14
Table 3.11 – reinstate temporary compound plant assumptions	14
Table 3.12 – reinstate roads / landscaping plant assumptions	15
Table 3.13 – building permanent access road (Tadcaster / Shipton-Tee) plant assumptions	16
Table 3.14 – existing tower / Osbaldwick demolition plant assumptions	16
Table 3.15 – new build tower / Osbaldwick erection	17
Table 3.16 – HDD crossing works plant assumptions	17
Table 3.17 – stringing plant assumptions	18
Table 3.18 – temporary compound use – night-time plant assumptions	18

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Figure 2.1 – Overton Substation area works	2
Figure 2.2 – Monk Fryston Substation area works	3
Figure 2.3 – Tadcaster area works	4
Figure 2.4 – Shipton-Tee area works	5

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## Version history

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Date	Version	Status	Description/changes
01/11/2022	A	Final	First Issue

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# **1. Construction Plant and Activity Assumptions**

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# 1. Introduction

## 1.1 Background

- 1.1.1 National Grid Electricity Transmission plc (“National Grid”) is in the process of submitting a Development Consent Order (DCO) application for the Yorkshire Green Energy Enablement (GREEN) Project (referred to as Yorkshire GREEN or the Project).
- 1.1.2 Yorkshire GREEN comprises the installation of new electricity infrastructure and works to existing infrastructure. A summary description of the Project is provided in **Section 14.1 of Chapter 14: Noise and Vibration (Volume 5, Document 5.2.14)**, which this appendix supports, and a more detailed description is provided in **Chapter 3: Description of the Project (Volume 5, Document 5.2.3)**.

## 1.2 Purpose of this Document

- 1.2.1 This document presents the assumptions used in the construction noise assessment presented in the ES **Chapter 14 Noise and Vibration, Volume 5, Document 5.2.14**.
- 1.2.2 Sound power levels have been taken from Annex C and Annex D of BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*.<sup>1</sup> (hereafter referred to as BS5228-1).
- 1.2.3 The assessment is based on the reasonable worst-case phases of construction, as described in this document.

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<sup>1</sup> British Standards Institute (2014). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise. BSI, London.

## 2. Reasonable worst case construction phases

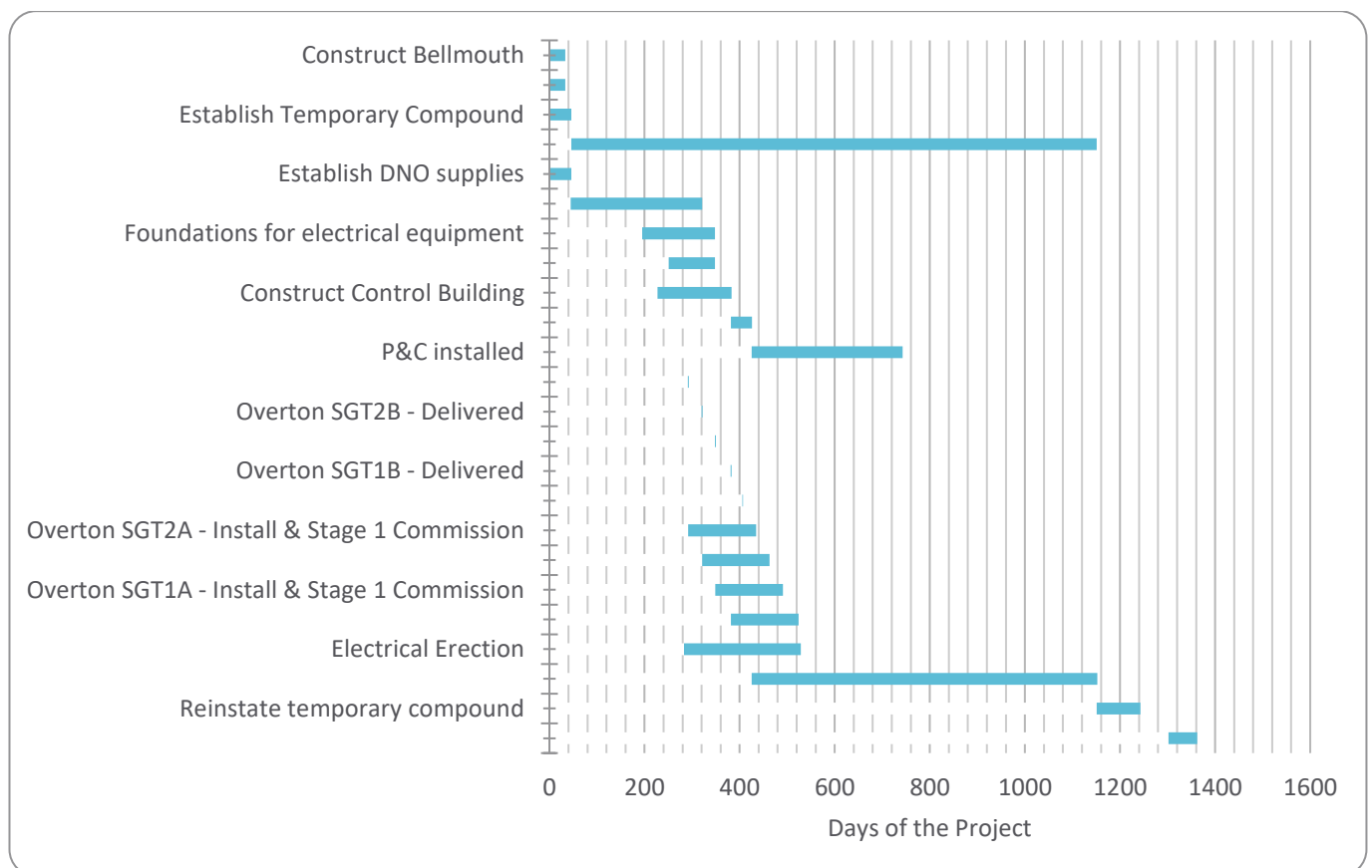
### 2.1 Method of determining reasonable worst-case

2.1.1 The indicative construction programme (**Chapter 3: Description of the Project, Volume 5, Document 5.2.3**) has been reviewed to determine when the most noise-inducing period of construction will take place for the main areas of working: Overton Substation area, Monk Fryston Substation area, Tadcaster area and Shipton-Tee area. Noise from stringing works between pylons has also been modelled throughout the route.

### 2.2 Overton Substation area

2.2.1 The Gantt chart presented in **Figure 2.1** shows the stages of works proposed for Overton Substation.

**Figure 2.1 – Overton Substation area works**



2.2.2 It is, therefore, determined that the worst-case periods of construction in the Overton Substation area, are while the temporary construction compound is in operation, while the main compound is being established, while foundations for electrical equipment are

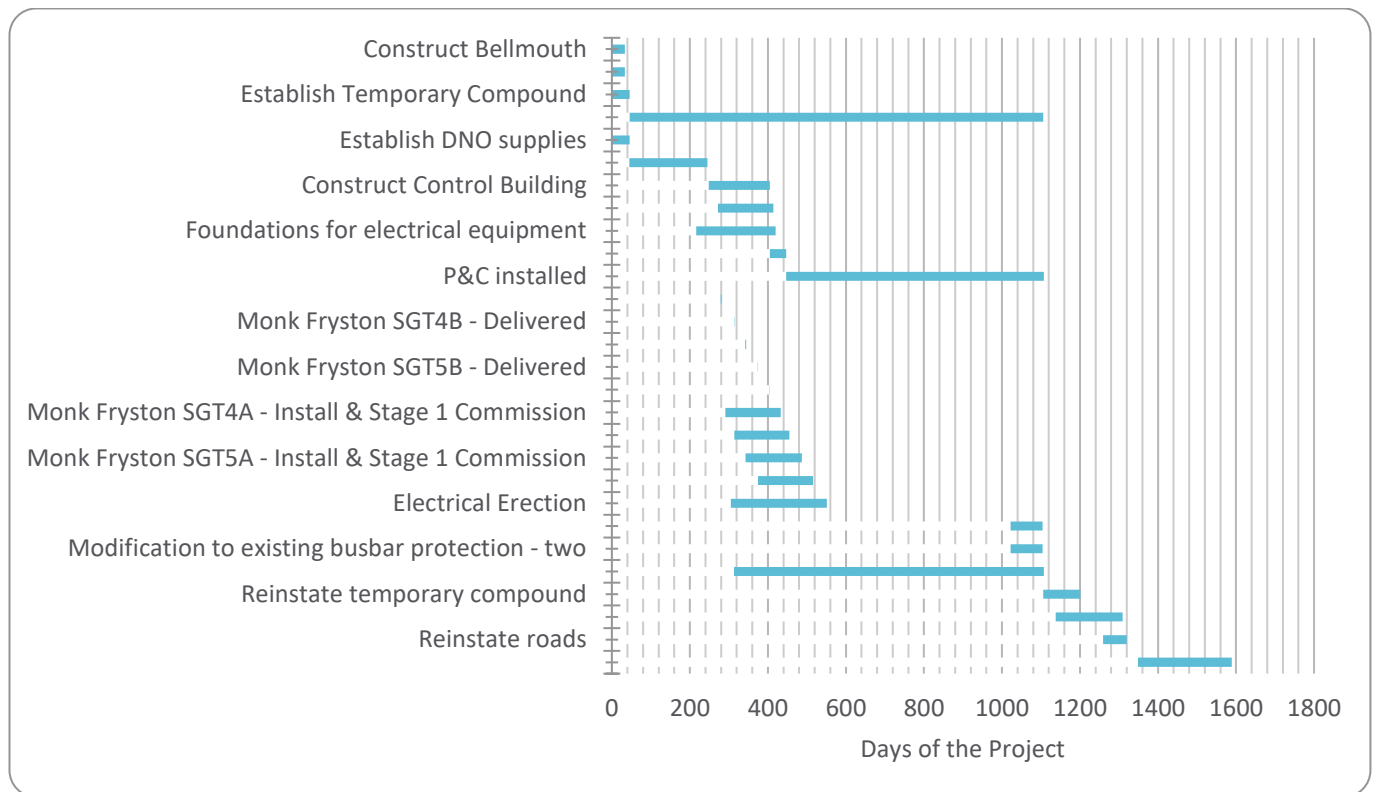


being laid, while troughing / ducting works are taking place and the control building is being constructed. These activities have been taken forward into modelling and the construction noise assessment.

## 2.3 Monk Fryston Substation area

2.3.1 The Gantt chart presented in **Figure 2.2** shows the stages of works proposed for Monk Fryston Substation.

**Figure 2.2 – Monk Fryston Substation area works**

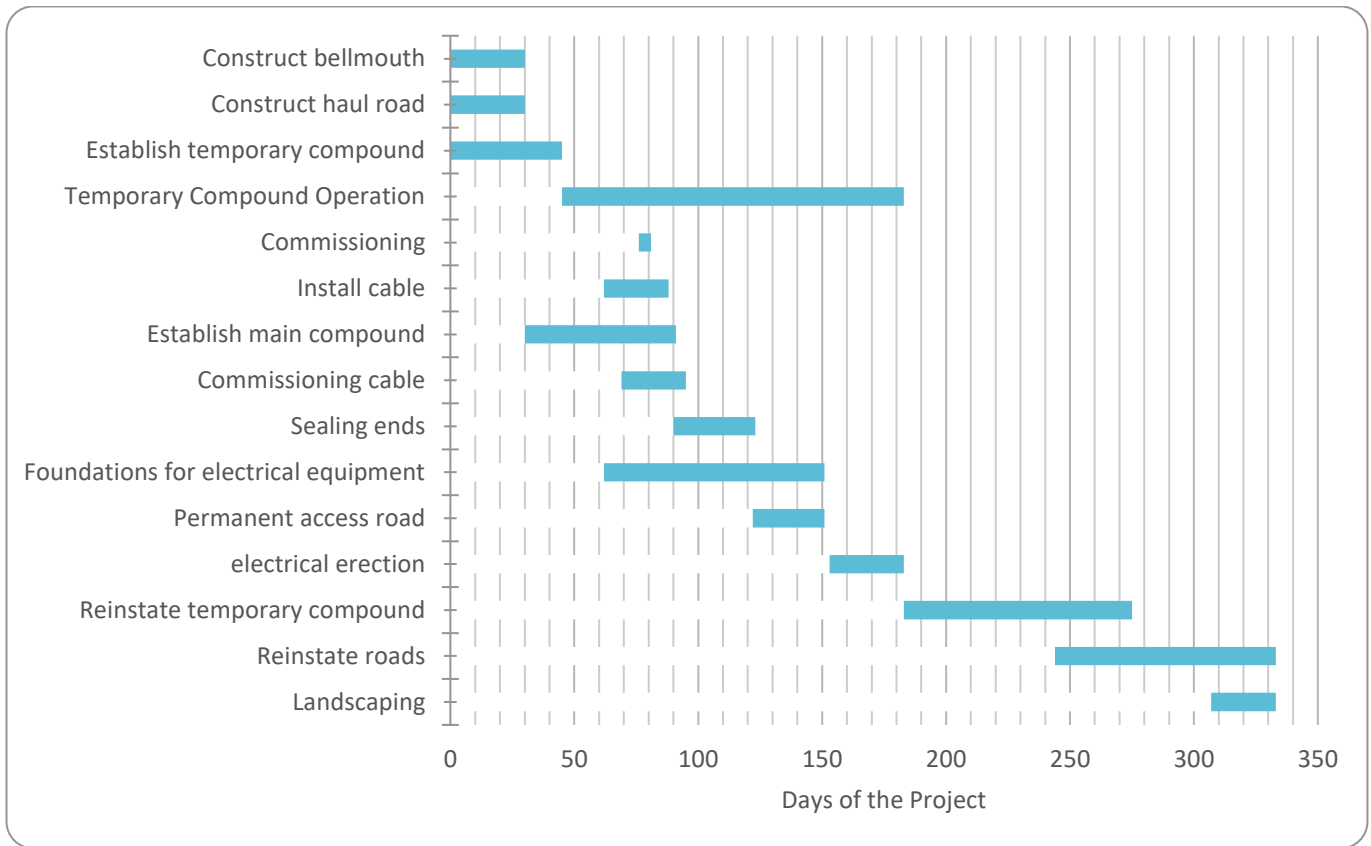


2.3.2 It is determined that the worst-case periods of construction in the Monk Fryston Substation area are while the temporary construction compound is in operation, while foundations for electrical equipment are being laid, while troughing / ducting works are taking place and the control building is being constructed. These activities have been taken forward into modelling and the construction noise assessment.

## 2.4 Tadcaster area

2.4.1 The Gantt chart presented in **Figure 2.3** shows the stages of works proposed for Tadcaster.

**Figure 2.3 – Tadcaster area works**



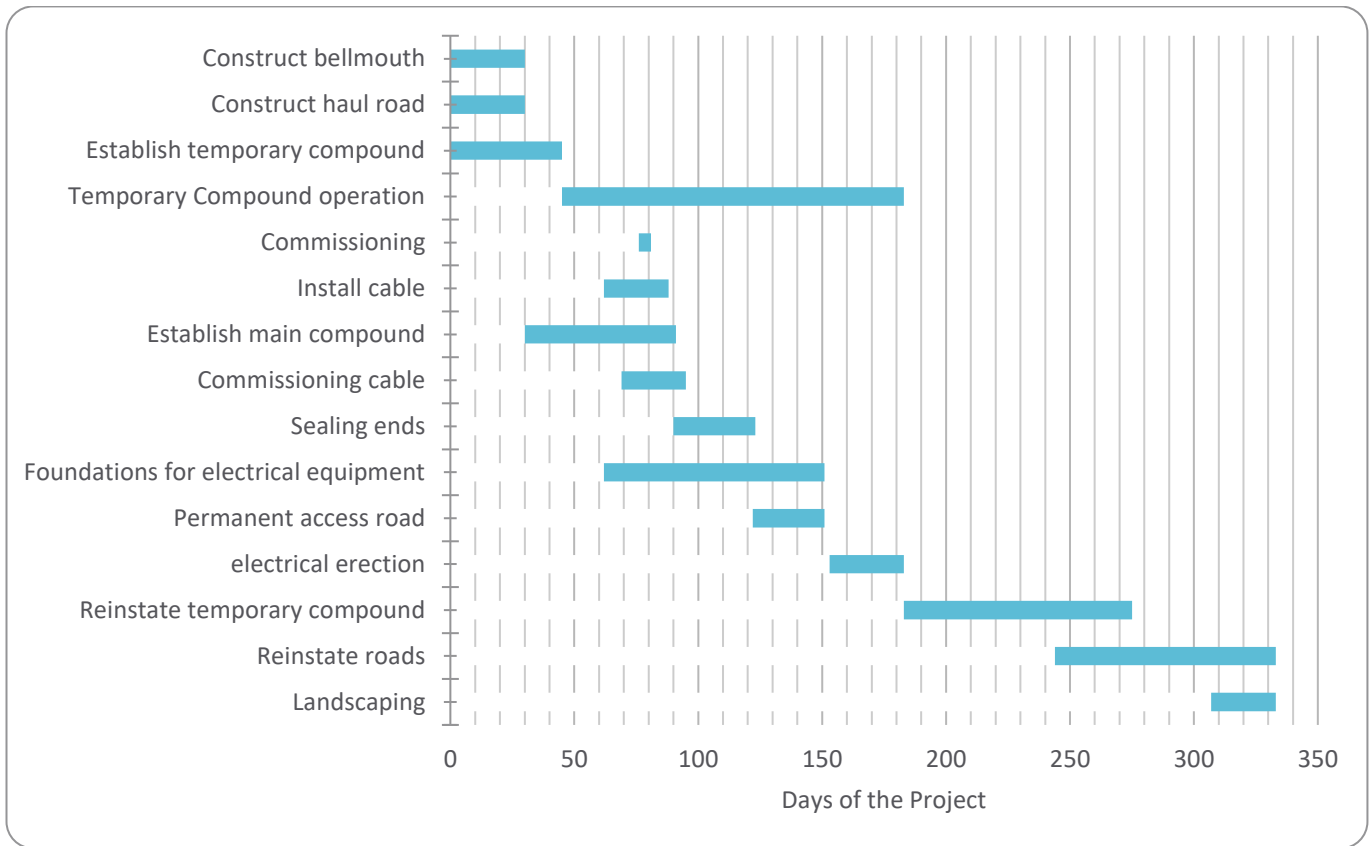
2.4.2 It is determined that the worst-case periods of construction in the Tadcaster area are while the temporary construction compound is in operation, while the main compound is being established and while foundations for electrical equipment are being laid. These activities have been taken forward into modelling and the construction noise assessment.

2.4.3 Horizontal Direct Drilling (HDD) works have also been modelled as 24-hour operations, as such works generally require plant to be working continuously throughout the activity to prevent collapses during the drilling.

## 2.5 Shipton-Tee area

2.5.1 The Gantt chart presented in **Figure 2.4** shows the stages of works proposed for Shipton-Tee.

**Figure 2.4 – Shipton-Tee area works**



2.5.2 It is determined that the worst-case periods of construction in the Shipton-Tee area are while the temporary construction compound is in operation, while the main compound is being established and while foundations for electrical equipment are being laid. These activities have been taken forward into modelling and the construction noise assessment.

## 3. Plant assumptions

3.1.1 **Table 3.1** to **Table 3.18** display the plant assumptions, along with sound power levels, for a range of activities used in the construction noise assessment:

- construct bellmouth/haul road;
- establish temporary compound;
- establish main compound;
- temporary compound use – Overton;
- temporary compound use – Monk Fryston;
- temporary compound use – Tadcaster;
- temporary compound use – Shipton-Tee;
- laying foundations for electrical equipment;
- troughing / ducting works;
- construct control building;
- reinstate temporary compound;
- reinstate roads/landscaping;
- building permanent access road (Tadcaster/Shipton-Tee);
- existing pylon/Osbaldwick demolition;
- new build pylon/Osbaldwick erection;
- HDD crossing works;
- stringing; and
- temporary compound use – night-time.

3.1.2 The tables use source terms and calculation methodology as defined in BS5228-1

3.1.3 Noise level data source show the references to the source data from the relevant Annexes in BS5228-1. For example C5.18 refers to Annex C Table 5, row 18 – Tracked excavator.

3.1.4 The “On time (%)” refers to the proportion of the assessment period from BS5228-1 that the plant items are operational. For example, if an excavator works for 30 minutes each hour, the on-time is 50%.

3.1.5 Sound power level is the sound power (ref 10-12 W) in decibels of the equipment, derived from the sound pressure level as measured at 10m using methodology from Annex F of BS5228-1

3.1.6 The Corrected sound power is calculated using the following equation:

$$L_{wPlant} = L_{wref} + 10 \log_{10}(\% \text{ on time} + \text{Number})$$

3.1.7 Sound power levels ( $L_{w\text{ref}}$ ) that are identified by an asterisk (\*) are measured as an  $L_{w\text{max}}$  from a vehicle pass-by at 10 m. the inclusion of these levels are consistent with the derivation of worst case activity levels.

**Table 3.1 – Construct bellmouth/haul road plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w\text{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w\text{plant}}$
1	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
2	Vibratory Roller	C5.20 Vibratory roller	1	20	103	96
3	Articulated Dump Truck	C5.16 Articulated dump truck	1	10	109*	99
4	Wheel Wash	C3.13 Water jet pump	1	50	91	88
5	Heavy Goods Vehicle (HGV)	C8.21 Skip wagon	1	30	106*	101
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>108</b>

**Table 3.2 – Establish temporary compound plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w\text{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w\text{plant}}$
6	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
7	Articulated Dump Truck	C5.16 Articulated dump truck	1	50	109*	106
8	Wheel Wash	C3.13 Water jet pump	1	50	91	88
9	HGV	C8.21 Skip wagon	1	50	106*	103
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>110</b>

**Table 3.3 – Establish main compound plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
10	Tracked Excavator	C5.18 Tracked excavator	3	50	108	110
11	Articulated Dump Truck	C5.16 Articulated dump truck	5	50	109*	113
12	Wheel Wash	C3.13 Water jet pump	2	50	91	91
13	HGV	C8.21 Skip wagon	3	30	106	105
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>115</b>

**Table 3.4 – Temporary compound use - Overton plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
14	44 tone articulated HGV	C11.4 Lorry	1	30	111*	106
15	7.5+ tonne rigid body twin axle HGV	C8.21 Skip wagon	1	30	106*	101
16	<7.5 tonne rigid body twin axle LGV	C8.21 Skip wagon	1	30	106*	101
17	2.5 tonne Telehandler	C4.55 Telescopic handler	2	50	99	99
18	50t all terrain mobile crane	C4.46 Mobile telescopic crane	1	50	95	92
19	Mobile batching plant	D6.11 Batching Plant (Spectra from C4.27)	1	80	108	107
20	Wheel Wash	C3.13 Water jet pump	1	50	91	88
21	Frontloader	C6.32 Wheeled loader (loading hopper)	1	80	103	102

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
22	Mobile Recycling Crushing Plant	C1.15 Tracked crusher	1	80	112	111
23	Diesel Generators	C6.39 Diesel generator	4	95	93	99
24	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
25	Generators	C3.32 Generator for welding	4	80	101	107
26	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	80	101	103
27	Angle Grinder	C4.93 Angle grinder (grinding steel)	4	80	109	114
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>118</b>

**Table 3.5 – Temporary compound use – Monk Fryston plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
28	44 tone articulated HGV	C11.4 Lorry	1	30	111*	106
29	7.5+ tonne rigid body twin axle HGV	C8.21 Skip wagon	1	30	106*	101
30	<7.5 tonne rigid body twin axle LGV	C8.21 Skip wagon	1	30	106*	101
31	2.5 tonne Telehandler	C4.55 Telescopic handler	2	50	99	99
32	50t all-terrain mobile crane	C4.46 Mobile telescopic crane	1	50	95	92
33	Mobile batching plant	D6.11 Batching Plant (Spectra from C4.27)	1	80	108	107

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
34	Wheel Wash	C3.13 Water jet pump	1	50	91	88
35	Frontloader	C6.32 Wheeled loader (loading hopper)	1	80	103	102
36	Mobile Recycling Crushing Plant	C1.15 Tracked crusher	1	80	112	111
37	Diesel Generators	C6.39 Diesel generator	4	95	93	99
38	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
39	Generators	C3.32 Generator for welding	4	80	101	107
40	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	80	101	103
41	Angle Grinder	C4.93 Angle grinder (grinding steel)	4	80	109	114
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>118</b>

**Table 3.6 – Temporary compound use - Tadcaster plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
42	44 tone articulated HGV	C11.4 Lorry	1	30	111*	106
43	7.5+ tonne rigid body twin axle HGV	C8.21 Skip wagon	1	30	106*	101
44	<7.5 tonne rigid body twin axle LGV	C8.21 Skip wagon	1	30	106*	101
45	2.5 tonne Telehandler	C4.55 Telescopic handler	2	50	99	99



Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
46	50t all-terrain mobile crane	C4.46 Mobile telescopic crane	1	50	95	92
47	Mobile batching plant	D6.11 Batching Plant (Spectra from C4.27)	1	80	108	107
48	Wheel Wash	C3.13 Water jet pump	1	50	91	88
49	Frontloader	C6.32 Wheeled loader (loading hopper)	1	80	103	102
50	Mobile Recycling Crushing Plant	C1.15 Tracked crusher	1	80	112	111
51	Diesel Generators	C6.39 Diesel generator	4	95	93	99
52	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
53	Generators	C3.32 Generator for welding	4	80	101	107
54	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	80	101	103
55	Angle Grinder	C4.93 Angle grinder (grinding steel)	4	80	109	114
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>118</b>

**Table 3.7 – Temporary compound use – Shipton-Tee plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
56	44 tone articulated HGV	C11.4 Lorry	1	30	111*	106
57	7.5+ tonne rigid body twin axle HGV	C8.21 Skip wagon	1	30	106*	101

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
58	<7.5 tonne rigid body twin axle LGV	C8.21 Skip wagon	1	30	106*	101
59	2.5 tonne Telehandler	C4.55 Telescopic handler	2	50	99	99
60	50t all-terrain mobile crane	C4.46 Mobile telescopic crane	1	50	95	92
61	Mobile batching plant	D6.11 Batching Plant (Spectra from C4.27)	1	80	108	107
62	Wheel Wash	C3.13 Water jet pump	1	50	91	88
63	Frontloader	C6.32 Wheeled loader (loading hopper)	1	80	103	102
64	Mobile Recycling Crushing Plant	C1.15 Tracked crusher	1	80	112	111
65	Diesel Generators	C6.39 Diesel generator	4	95	93	99
66	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
67	Generators	C3.32 Generator for welding	4	80	101	107
68	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	80	101	103
69	Angle Grinder	C4.93 Angle grinder (grinding steel)	4	80	109	114
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>118</b>

**Table 3.8 – Laying foundations for electrical equipment plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
70	Articulated Dump Truck	C5.16 Articulated dump truck	3	50	109*	111
71	HGV	C8.21 Skip wagon	1	30	106*	101
72	Tracked Excavator	C2.3 Tracked excavator	3	50	106	108
73	Wheel Wash	C3.13 Water jet pump	1	50	91	88
74	Hydraulic Hammer Rig	C3.1 Hydraulic hammer rig	1	30	117	111
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>115</b>

**Table 3.9 – Troughing / ducting works plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
75	Articulated Dump Truck	C5.16 Articulated dump truck	3	50	109*	111
76	Tracked Excavator	C2.3 Tracked excavator	3	50	106	108
77	Wheel Wash	C3.13 Water jet pump	1	50	91	88
78	HGV	C8.21 Skip wagon	1	30	106*	101
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>113</b>

**Table 3.10 – Construct control building plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
79	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
80	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	80	101	103
81	Generator for Welding	C3.32 Generator for welding	2	100	101	104
82	Gas Cutter	C3.34 Gas cutter (cutting top of pile)	1	40	96	92
83	Cement Mixer Truck (Discharging)	C4.18 Cement mixer truck (discharging)	1	20	103	96
84	Wheel Wash	C3.13 Water jet pump	1	50	91	88
85	Cement Mixer Truck (Idling)	C4.19 Cement mixer truck (idling)	1	80	99	98
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>110</b>

**Table 3.11 – Reinstate temporary compound plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
86	Dozer	C2.1 Dozer	1	50	103	100
87	Wheel Wash	C3.13 Water jet pump	1	50	91	88
88	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
89	Articulated Dump Truck	C5.16 Articulated dump truck	1	10	109	99
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>107</b>

**Table 3.12 – Reinstatement roads / landscaping plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{wref}$	Sound power corrected for no. & on time, dB(A) $L_{wplant}$
90	Dozer	C2.1 Dozer	1	50	103	100
91	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
92	Articulated Dump Truck	C5.16 Articulated dump truck	1	10	109	99
93	Road Planer	C5.7 Road planer	1	20	110	103
94	Wheel Wash	C3.13 Water jet pump	1	50	91	88
95	Vibratory Roller	C5.20 Vibratory roller	1	20	103	96
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>109</b>

**Table 3.13 – Building permanent access road (Tadcaster/Shipton-Tee) plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
96	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
97	Vibratory Roller	C5.20 Vibratory roller	1	20	103	96
98	Articulated Dump Truck	C5.16 Articulated dump truck	1	10	109	99
99	Grader	C6.31 Grader	1	50	115	112
100	HGV	C8.21 Skip wagon	1	30	106	101
101	Road Planer	C5.7 Road planer	1	20	110	103
102	Wheel Wash	C3.13 Water jet pump	1	50	91	88
103	Vibratory Roller	C5.20 Vibratory roller	1	20	103	96
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>113</b>

**Table 3.14 – Existing tower / Osbaldwick demolition plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
104	Dozer	C2.1 Dozer	1	50	103	100
105	Wheel Wash	C3.13 Water jet pump	1	50	91	88
106	Tracked Excavator	C5.18 Tracked excavator	1	50	108	105
107	Articulated Dump Truck	C5.16 Articulated dump truck	1	10	109	99
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>107</b>

**Table 3.15 – New build tower / Osbaldwick erection**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
108	200t Crane	C4.38 Wheeled mobile telescopic crane	1	80	106	105
109	Handheld Welder	C3.31 Hand-held welder (welding piles)	2	90	101	103
110	Generator for Welding	C3.32 Generator for welding	2	100	101	104
111	Gas Cutter	C3.34 Gas cutter (cutting top of pile)	1	40	96	92
112	Cement Mixer Truck (Discharging)	C4.18 Cement mixer truck (discharging)	1	20	103	96
113	Cement Mixer Truck (Idling)	C4.19 Cement mixer truck (idling)	1	80	99	98
114	Wheel Wash	C3.13 Water jet pump	1	50	91	88
115	Large Rotary Bored Piling Rig	C3.14 Large rotary bored piling rig	1	20	112	105
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>111</b>

**Table 3.16 – HDD crossing works plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
116	HDD Rig	C3.21 Crawler mounted rig	1	100	107	107
117	Supports for HDD Rig	C4.92 Mounting supports for directional drill (hydraulic hammer)	1	100	115	115
118	Generator for HDD rig	C4.96 Directional drill (generator)	2	100	106	109
119	Pump	C3.25 Concrete pump	2	100	106	109

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
120	Generator for pump	C4.80 Diesel generator	2	100	88	91
121	Dump truck	C6.13 Dump truck	1	100	120	120
122	Tracked excavator	C2.2 Tracked excavator	1	100	105	105
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>122</b>

**Table 3.17 – Stringing plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
123	Winch tractor	C4.74 Tractor (towing equipment)	1	100	108	108
124	Winch	D4.25. Tripod winch (Spectra from C10.20)	1	100	112	112
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>113</b>

**Table 3.18 – Temporary compound use – night-time plant assumptions**

Ref.	Plant description	Noise level data source	No. of plant	On time (%)	Sound power level, dB(A) $L_{w_{ref}}$	Sound power corrected for no. & on time, dB(A) $L_{w_{plant}}$
125	Generators	C6.39 Diesel generator	4	100	93	99
<b>Total sound power, corrected for on time, dB(A) <math>L_w</math></b>						<b>99</b>



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