

**UPDATE OF NOISE DATABASE FOR  
PREDICTION OF NOISE  
ON CONSTRUCTION AND OPEN SITES**

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## **UPDATE OF NOISE DATABASE FOR PREDICTION OF NOISE ON CONSTRUCTION AND OPEN SITES**

Hepworth Acoustics Ltd was commissioned by the Department for Environment, Food and Rural Affairs (Defra) to produce an up-to-date database of noise emissions from equipment used on construction and open sites [An existing construction plant noise database is contained in Annex C, Part 1 of British Standard 5228 'Noise and vibration control on construction and open sites']. The report was completed in December 2004, and the database is presented by Defra herein.

The objective of the project was to obtain measurements of noise from plant and equipment currently used on construction and open sites in the UK, and to prepare a database of the information. As well as obtaining data for equipment put into operation since the publication of BS 5228 in 1977, the database extends on the data in that standard by presenting octave band noise levels, and by including data for plant used on waste disposal (landfill) sites.

The data were obtained by field measurement for items of plant in actual use on construction and open sites in the UK. Levels quoted in the database are based on an average (logarithmic) of measured sound levels, and where appropriate have been derived from more than one model of similarly sized plant to simplify the database.

The results are presented as un-weighted octave band activity  $L_{eq}$  levels, and overall A-weighted activity  $L_{eq}$  values in dB. Where relevant, pass-by measurements were made for moving sources, and these are presented as un-weighted octave band activity  $L_{max}$  levels, and overall A-weighted  $L_{max}$  values in dB. All sound pressure levels are standardized to 10 metres from the plant. Weights for machines, where given, relate to the usual weight references used in the construction industry (weights for machines such as bulldozers, excavators, rollers, etc, are the actual weights of the machines; weights for dump trucks and dumpers are the load capacity weights; and weights for cranes are the lifting capacity weights).

The database is presented with the intention that it may be useful to the practitioner, as it represents a recent inventory of construction noise sources. Where possible measurements of the actual plant in operation on site should be used, however this data could provide an alternative to manufacturer-quoted noise levels. The data has been gathered in a rigorous manner, but it should be understood that it is provided as an *indication* of the noise emission of various types of plant, and should be applied as such, accepting that many factors will influence the output of any particular item of plant (e.g. condition, model, environment, load, etc.). Defra requests that if any issues arise with the application of the database, or if there are any comments relating to the data, that the user contact the department through either of the channels below:

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**Table 1 Sound level data on demolition**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB
				63	125	250	500	1k	2k	4k	8k	
<b>Breaking Up Concrete</b>												
1	Breaker Mounted on Wheeled Backhoe	59	(7.4 t) 380 kg / 1700 mm tool / 74 mm dia / 125 bar	79	82	81	82	86	86	86	85	<b>92</b>
2	Breaker Mounted on Wheeled Backhoe	-	380 kg / 1700mm tool / 74 mm dia / 125 bar	79	84	82	84	88	85	84	82	<b>92</b>
3	Pulverizer Mounted on Excavator	-	-	85	76	74	75	74	75	70	65	<b>80</b>
4	Pulverizer Mounted on Excavator	147	30 t	75	72	71	73	70	69	66	59	<b>76</b>
5	Pulverizer Mounted on Excavator	143	29 t	73	73	69	70	67	64	58	51	<b>72</b>
6	Hand-held Pneumatic Breaker	-	-	83	83	81	74	73	76	78	77	<b>83</b>
7	Hand-held Hydraulic Breaker	-	20 kg / 69 bar	82	81	87	87	88	86	83	87	<b>93</b>
8	Hydraulic Breaker Power Pack	6	63 kg/ 138 bar	77	72	73	69	68	66	64	60	<b>74</b>
<b>Breaking Up Brick Foundations</b>												
9	Breaker Mounted on Excavator	121	(15 t) 1650 kg breaker	88	88	86	89	83	83	80	76	<b>90</b>
<b>Dumping Brick Rubble</b>												
10	Tracked Excavator (Loading Dump Truck)	228	44 t	82	78	82	81	81	78	72	64	<b>85</b>
11	Articulated Dump Truck (Dumping Rubble)	250	28 t	94	76	77	75	76	73	68	63	<b>80</b>
<b>Breaking and Spreading Rubble</b>												
12	Tracked Excavator	228	44 t	79	81	83	79	77	75	70	62	<b>82</b>
13	Tracked Excavator	205	40 t	81	80	80	83	82	79	76	73	<b>86</b>
<b>Crushing Concrete / Rubble</b>												
14	Tracked Crusher	172	47 t	93	86	79	81	75	71	66	59	<b>82</b>
15	Tracked Crusher	-	-	86	84	84	81	78	75	71	66	<b>84</b>
<b>Breaking Up / Cutting Steel</b>												
16	Tracked Excavator	205	40 t	75	74	77	80	78	74	67	61	<b>82</b>
17	Tracked Excavator	74	14 t	79	77	76	77	78	78	73	66	<b>83</b>
18	Gas Cutter	-	-	72	72	69	72	73	72	71	71	<b>79</b>
<b>Breaking Stud Partition</b>												
19	Lump Hammer	-	-	66	66	68	68	63	57	55	51	<b>69</b>
<b>Breaking Windows</b>												
20	Lump Hammer	-	-	77	75	71	72	74	74	75	73	<b>81</b>

**Table 2 Sound level data on site preparation**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level $L_{Aeq}$ dB
				63	125	250	500	1k	2k	4k	8k	
<b>Clearing Site</b>												
1	Dozer Ж	142	20 t	79	77	76	74	68	67	60	59	<b>75 Ж</b>
2	Tracked Excavator	301	71 t	75	84	78	74	70	68	64	61	<b>77</b>
3	Tracked Excavator	102	22 t	80	83	76	73	72	70	69	66	<b>78</b>
4	Tracked Excavator (Idling)	102	22 t	59	49	45	45	49	46	39	31	<b>52</b>
5	Tracked Excavator	72	16 t	78	70	72	68	67	66	73	65	<b>76</b>
6	Tracked Excavator (Idling)	72	16 t	64	62	64	62	56	53	47	39	<b>63</b>
7	Tracked Excavator	69	14 t	74	70	68	67	64	62	58	50	<b>70</b>
8	Wheeled Backhoe Loader	62	8 t	74	66	64	64	63	60	59	50	<b>68</b>
9	Wheeled Backhoe Loader (Idling)	62	8 t	60	53	49	52	51	48	43	33	<b>55</b>
<b>Ground Excavation / Earthworks</b>												
10	Dozer	239	41 t	89	90	81	73	74	70	68	64	<b>80</b>
11	Dozer	179	28 t	75	79	77	77	74	71	65	57	<b>79</b>
12	Dozer	142	20 t	85	74	76	73	72	78	62	56	<b>81</b>
13	Dozer	82	11 t	74	83	78	74	74	70	67	62	<b>78</b>
14	Tracked Excavator	226	40 t	85	78	77	77	73	71	68	63	<b>79</b>
15	Tracked Excavator	173	32 t	77	85	70	73	70	68	63	57	<b>76</b>
16	Tracked Excavator	170	30 t	72	71	74	73	69	66	63	58	<b>75</b>
17	Tracked Excavator	162	28 t	78	78	75	71	72	68	63	55	<b>76</b>
18	Tracked Excavator	134	27 t	81	77	74	70	70	66	60	56	<b>75</b>
19	Tracked Excavator	125	25 t	95	84	79	73	70	68	64	57	<b>77</b>
20	Tracked Excavator (Idling)	125	25 t	80	76	65	65	63	58	53	49	<b>68</b>
21	Tracked Excavator	107	22 t	75	76	72	68	65	63	57	49	<b>71</b>
22	Tracked Excavator	96	-	78	74	68	68	67	66	61	53	<b>72</b>
23	Tracked Excavator	92	-	79	81	68	69	66	65	61	52	<b>73</b>
24	Tracked Excavator	71	15 t	77	74	71	70	68	66	60	54	<b>73</b>
25	Tracked Excavator	66	14 t	77	65	67	67	63	61	57	47	<b>69</b>

Ж Drive-by maximum sound pressure level in  $L_{max}$  (Octave Bands) and  $L_{Amax}$  (Overall Level)

<b>Loading Lorries</b>													
26	Wheeled Loader	209	-	87	82	77	78	73	70	64	57	<b>79</b>	
27	Wheeled Loader	193	-	85	83	76	75	75	72	72	61	<b>80</b>	
28	Wheeled Loader	170	-	86	82	77	74	70	66	62	55	<b>76</b>	
29	Tracked Excavator	75	15 t	80	79	76	77	73	70	66	59	<b>79</b>	
<b>Distribution of Material</b>													
30	Dump Truck (Tipping Fill)	306	29 t	85	74	78	73	73	74	67	63	<b>79</b>	
31	Dump Truck (Empty) Ж	306	29 t	86	79	79	79	79	84	69	60	<b>87 Ж</b>	
32	Articulated Dump Truck (Tipping Fill)	187	23 t	80	76	73	70	69	66	63	58	<b>74</b>	
33	Articulated Dump Truck Ж	187	23 t	85	87	77	75	76	73	69	62	<b>81 Ж</b>	
34	Lorry Ж	-	4-axle wagon	73	78	78	78	74	73	68	66	<b>80 Ж</b>	
35	Telescopic Handler	60	10 t	85	79	69	67	64	62	56	47	<b>71</b>	
<b>Rolling and Compaction</b>													
36	Dozer (Towing Roller)	142	20 t	83	77	77	76	76	75	68	56	<b>81</b>	
37	Roller (Rolling fill) Ж	145	18 t	72	75	81	78	74	70	63	55	<b>79 Ж</b>	
38	Roller Ж	145	18 t	80	75	77	72	67	62	54	46	<b>73 Ж</b>	
39	Vibratory Roller Ж	29	4 t	88	83	69	68	67	65	62	59	<b>74 Ж</b>	
40	Vibratory Roller Ж	20	3 t	82	78	67	71	67	64	60	57	<b>73 Ж</b>	
41	Vibratory Plate (Petrol)	3	62 kg	70	74	71	78	74	75	63	58	<b>80</b>	
42	Hydraulic Vibratory Compactor (Tracked Excavator)	-	225 kg / 193 bar / 17,500 N	81	76	72	73	72	72	68	63	<b>78</b>	
<b>Ground Investigation Drilling</b>													
43	Cable Percussion Drilling Rig	18	2 t / 150 mm diameter / 75 m depth	77	77	67	66	70	68	62	56	<b>74</b>	
<b>Directional Drilling</b>													
44	Directional Drill (Generator)	106	-	67	80	74	72	72	72	68	61	<b>77</b>	
<b>Pumping Water</b>													
45	Water Pump	20	6"	73	68	62	62	61	56	53	41	<b>65</b>	
46	Water Pump	-	4"	75	74	60	54	54	53	48	46	<b>62</b>	

Ж Drive-by maximum sound pressure level in  $L_{max}$  (Octave Bands) and  $L_{Amax}$  (Overall Level)

**Table 3 Sound level data on piling and ancillary operations**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB
				63	125	250	500	1k	2k	4k	8k	
<b>Pre-cast Concrete Piling - Hydraulic Hammer</b>												
1	Hydraulic Hammer Rig	145	16 m length / 5 t hammer / plywood dolly	82	82	82	89	83	78	75	70	<b>89</b>
<b>Tubular Steel Piling - Hydraulic Hammer</b>												
2	Hydraulic Hammer Rig	186	4 t hammer	80	87	88	84	83	78	74	65	<b>87</b>
3	Hydraulic Hammer Rig	-	240 mm diameter	87	93	85	87	83	80	75	72	<b>88</b>
4	Hydraulic Hammer Rig	-	(1 t) 2 m length / 300 mm diameter	73	65	65	64	70	72	72	68	<b>77</b>
5	Drop Hammer Pile Rig Power Pack	23	-	79	65	60	59	66	63	53	46	<b>69</b>
<b>Tubular Steel Piling - Hydraulic Jacking</b>												
6	Piling	2800 kN	10 t / 13 m length / 900 mm width / soil	80	74	70	65	61	57	49	43	<b>68</b>
7	Power Pack	147	6 t	77	78	73	66	63	57	50	42	<b>70</b>
<b>Sheet Steel Piling - Vibratory</b>												
8	Vibratory Piling Rig	-	52 t / 14 m length / soft clay	83	82	79	82	84	82	77	67	<b>88</b>
<b>Sheet Steel Piling - Hydraulic Jacking</b>												
9	Piling	1500 kN	10 t / 7.4 m length / 600 mm width / sandy clay	74	71	63	60	56	54	50	44	<b>63</b>
10	Power Pack	147	6 t	80	75	69	67	61	55	49	43	<b>68</b>
11	Piling	980 kN	7.4 t / 12 m length / 500 mm width	68	60	59	57	51	50	45	44	<b>59</b>
12	Rig Power Pack	-	5 t	74	70	66	60	54	51	46	42	<b>63</b>
13	Water Jet Pump	-	-	75	75	62	58	55	54	48	40	<b>63</b>
<b>Rotary Bored Piling - Cast in Situ</b>												
14	Large Rotary Bored Piling Rig	-	110 t / 20 m deep / 1.2 m diameter	84	92	81	80	78	76	68	61	<b>83</b>
15	Tracked Drilling Rig with Hydraulic Drifter	104	12.5 t	75	79	76	73	74	79	74	69	<b>82</b>
16	Crane Mounted Auger	-	-	87	86	77	73	75	72	67	59	<b>79</b>
17	Mini Piling Rig	29	5.4 t / auger 10 m deep x 450 mm diameter piles	87	77	72	73	71	69	65	57	<b>76</b>
18	Mini Piling Rig	-	Auger 12 m deep x 250 mm diameter piles	74	72	65	71	70	68	63	57	<b>75</b>
19	Compressor for Mini Piling	45	1 t	75	71	65	70	71	69	62	57	<b>75</b>
20	Mini Tracked Excavator	17	2.8 t	76	73	62	66	62	59	54	49	<b>68</b>
<b>Continuous Flight Auger Piling - Cast in Situ</b>												
21	Crawler Mounted Rig	150	35 t	81	81	78	76	74	72	68	63	<b>79</b>

22	Crawler Mounted Rig	126	33 t	79	79	78	78	75	71	66	56	<b>80</b>
23	Tracked Excavator	-	-	84	76	67	64	62	59	53	43	<b>68</b>
24	Tracked Excavator (Inserting Cylindrical Metal Cage)	-	20 t	79	75	73	69	69	67	60	52	<b>74</b>
25	Concrete Pump	59	2.8 t / 180 mm diameter / 59 bar	84	76	70	71	73	73	66	58	<b>78</b>
26	Concrete Pump	25	120 mm diameter / 50 bar	82	82	72	71	69	68	62	54	<b>75</b>
<b>Vibro Stone Columns</b>												
27	Vibrodisplacement and Compaction of Stone Columns	60	17 t	91	84	79	77	74	69	70	59	<b>80</b>
<b>Craneage for Piling (lifting piles, casings, etc)</b>												
28	Tracked Mobile Crane	184	110 t	81	77	66	62	59	57	51	46	<b>67</b>
29	Tracked Mobile Crane	132	55 t	81	77	69	67	62	60	61	51	<b>70</b>
30	Wheeled Mobile Crane	-	70 t	80	72	71	67	65	62	57	49	<b>70</b>
<b>Welding / Cutting Steel Piles</b>												
31	Hand-Held Welder (Welding Piles)	-	-	67	68	69	68	69	66	61	56	<b>73</b>
32	Generator for Welding	-	-	75	72	67	68	70	66	62	60	<b>73</b>
33	Generator for Welding	6	508 kg	75	67	59	52	48	44	41	33	<b>57</b>
34	Gas Cutter (Cutting Top of Pile)	-	230 bar	74	74	72	61	60	58	56	56	<b>68</b>
35	Hand-held Gas Cutter	-	230 bar	74	76	66	58	56	56	55	55	<b>65</b>

**Table 4 Sound level data on general site activities**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB	
				63	125	250	500	1k	2k	4k	8k		
<b>Distribution of Materials</b>													
1	Articulated Dump Truck Ж	194	25 t	90	87	77	79	75	73	67	63	<b>81</b>	Ж
2	Articulated Dump Truck Ж	187	23 t	85	80	77	72	74	70	65	58	<b>78</b>	Ж
3	Dumper Ж	81	7 t	84	81	74	73	72	68	61	53	<b>76</b>	Ж
4	Dumper Ж	75	9 t	82	76	75	74	68	68	64	55	<b>76</b>	Ж
5	Dumper (Idling)	75	9 t	73	64	55	55	60	56	50	43	<b>63</b>	
6	Dumper Ж	60	6 t	89	86	77	74	72	72	66	62	<b>79</b>	Ж
7	Dumper Ж	56	5 t	90	86	72	71	71	71	66	59	<b>78</b>	Ж
8	Dumper (Idling)	56	5 t	68	56	47	49	52	50	41	32	<b>56</b>	
9	Dumper Ж	32	3 t	82	82	78	77	69	67	61	53	<b>77</b>	Ж
10	Wheeled Excavator	90	18 t	64	60	63	64	62	57	51	45	<b>66</b>	
11	Wheeled Excavator (Idling)	90	18 t	61	59	57	57	58	52	42	34	<b>61</b>	
12	Wheeled Excavator Ж	63	14 t	84	82	77	75	72	68	60	52	<b>77</b>	Ж
13	Wheeled Loader Ж	75	37 t	83	72	70	69	65	64	57	49	<b>71</b>	Ж
14	Wheeled Backhoe loader	62	9 t	68	67	63	62	62	61	54	47	<b>67</b>	
15	Fuel Tanker Lorry Ж	-	11 t	79	73	71	75	72	67	59	50	<b>76</b>	Ж
16	Fuel Tanker Pumping	-	25,000 litre	75	70	67	67	69	66	60	53	<b>72</b>	
17	Tracked Excavator	41	8 t	81	72	68	68	66	64	60	55	<b>71</b>	
<b>Mixing Concrete</b>													
18	Cement Mixer Truck (Discharging)	-	-	80	69	66	70	71	69	64	58	<b>75</b>	
19	Cement Mixer Truck (Idling)	-	-	77	71	65	65	66	66	60	51	<b>71</b>	
20	Concrete Mixer Truck	-	-	83	74	66	69	70	78	60	55	<b>80</b>	
21	Large Lorry Concrete Mixer	216	-	80	71	65	72	71	72	68	56	<b>77</b>	
22	Large Concrete Mixer	167	26 t	72	73	79	72	69	67	63	60	<b>76</b>	
23	Small Cement Mixer	2	-	61	65	58	58	57	53	51	49	<b>61</b>	
<b>Pumping Concrete</b>													
24	Concrete Pump + Cement Mixer Truck (Discharging)	223	8 t / 350 bar	69	64	64	66	63	59	53	47	<b>67</b>	
25	Concrete Pump + Concrete Mixer Truck (Pumping to 5th Floor)	171	6 t / 350 bar / 150 mm diameter	83	81	78	79	77	74	71	66	<b>82</b>	

Ж Drive-by maximum sound pressure level in L<sub>max</sub> (Octave Bands) and L<sub>Amax</sub> (Overall Level)

26	Concrete Pump + Concrete Mixer Truck (Idling)	171	6 t / 350 bar / 150 mm diameter	75	76	71	70	71	68	64	60	<b>75</b>
27	Concrete Mixer Truck	-	-	84	74	74	73	73	75	65	59	<b>79</b>
28	Concrete Mixer Truck (Discharging) & Concrete Pump (Pumping)	-	26 t (capacity) / 7 cu m + 22 m boom	79	80	73	72	69	68	59	53	<b>75</b>
29	Truck Mounted Concrete Pump + Boom Arm	-	26 t	83	77	75	75	74	75	67	63	<b>80</b>
30	Truck Mounted Concrete Pump + Boom Arm	-	17 t	71	76	71	76	76	72	66	62	<b>79</b>
31	Truck Mounted Concrete Pump + Boom Arm (Idling)	-	22 m boom	84	75	71	70	70	69	61	52	<b>75</b>
32	Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	-	-	73	73	77	76	72	70	65	62	<b>78</b>
<b>Concreting Other</b>												
33	Poker Vibrator	-	-	82	80	80	73	69	72	70	65	<b>78</b>
34	Poker Vibrator	2.2	-	62	70	70	64	62	61	59	56	<b>69</b>
35	Vibratory Tamper	1.1	15 kg	59	71	54	56	57	55	55	49	<b>63</b>
36	Pump Boom + Vibrating Poker	-	-	71	68	68	67	65	64	59	56	<b>71</b>
37	Concrete Placing Boom	-	142 mm diameter / 24 m reach	63	68	65	62	59	53	53	49	<b>65</b>
<b>Lifting</b>												
38	Wheeled Mobile Telescopic Crane	610	400 t	80	79	73	74	73	73	64	55	<b>78</b>
39	Mobile Telescopic Crane	315	80 t	87	82	78	74	71	67	60	52	<b>77</b>
40	Mobile Telescopic Crane (Idling)	315	80 t	75	72	65	62	61	60	52	45	<b>66</b>
41	Mobile Telescopic Crane	280	100 t	73	71	68	70	66	63	54	49	<b>71</b>
42	Mobile Telescopic Crane (Idling)	280	100 t	71	67	64	61	60	56	50	41	<b>64</b>
43	Wheeled Mobile Crane	275	35 t	80	76	71	63	64	63	56	50	<b>70</b>
44	Wheeled Mobile Crane (Idling)	275	35 t	73	66	55	56	56	53	45	36	<b>60</b>
45	Mobile Telescopic Crane	260	55 t	90	81	78	74	77	76	69	61	<b>82</b>
46	Mobile Telescopic Crane	240	50 t	78	69	67	64	62	57	49	40	<b>67</b>
47	Mobile Telescopic Crane (Idling)	240	50 t	67	66	59	58	56	53	44	35	<b>61</b>
48	Tower Crane	88	22 t	82	77	80	76	66	66	56	50	<b>76</b>
49	Tower Crane	51	12 t	84	79	80	76	70	63	57	51	<b>77</b>
50	Tracked Mobile Crane	390	600 t / 125 m	68	71	68	62	66	66	55	46	<b>71</b>
51	Tracked Mobile Crane (Idling)	390	600 t / 125 m	66	67	60	61	62	61	50	40	<b>66</b>
52	Tracked Mobile Crane	240	105 t	73	71	66	67	74	66	58	49	<b>75</b>
53	Lorry with Lifting Boom	50	6 t	81	78	76	74	72	69	64	56	<b>77</b>
54	Telescopic Handler	76	4 t	79	73	66	65	78	66	54	47	<b>79</b>
55	Telescopic Handler	75	3.7 t	82	72	63	65	67	64	56	49	<b>70</b>
56	Wheeled Excavator	63	14 t	87	84	80	81	78	75	69	67	<b>83</b>
57	Lifting Platform	35	8 t	78	76	62	63	60	59	58	49	<b>67</b>

58	Lifting Platform (Idling)	35	8 t	72	71	59	59	56	56	52	45	<b>63</b>
59	Diesel Scissor Lift	24	6 t	80	77	74	74	74	71	65	63	<b>78</b>
60	Diesel Scissor Lift (idling)	24	6 t	74	72	68	68	64	61	57	56	<b>70</b>
61	Caged Material Hoist (Electric)	-	500 kg	64	64	65	65	63	61	59	52	<b>68</b>
62	Site Lift for Workers	-	-	68	63	64	63	59	60	58	51	<b>66</b>
<b>Trenching</b>												
63	Tracked Excavator	223	40 t	77	86	75	75	71	69	64	55	<b>77</b>
64	Tracked Excavator	107	22 t	74	80	75	73	69	66	60	51	<b>75</b>
65	Tracked Excavator	95	21 t	76	74	68	70	65	63	59	55	<b>71</b>
66	Wheeled Backhoe Loader	63	8 t	72	63	67	67	63	62	56	50	<b>69</b>
67	Mini Tracked Excavator	-	5 t	87	79	76	70	68	64	57	48	<b>74</b>
68	Mini Tracked Excavator	30	5 t	71	71	66	59	59	58	54	48	<b>65</b>
<b>Core Drilling Concrete</b>												
69	Core Drill (Electric)	-	250 mm diameter bit	75	74	75	72	74	75	80	80	<b>85</b>
<b>Cutting Concrete Floor Slab</b>												
70	Petrol Hand-held Circular Saw	3	9 kg / 300 mm diameter	72	89	81	80	80	82	86	85	<b>91</b>
<b>Cutting Concrete Blocks / Paving Slabs</b>												
71	Circular Bench Saw (Petrol - Cutting Concrete Blocks)	-	-	85	74	72	70	72	76	82	77	<b>85</b>
72	Hand-held Circular Saw (Petrol - Cutting Concrete Blocks)	3	9 kg	69	75	77	74	71	70	74	69	<b>79</b>
73	Hand-held Circular Saw (Cutting Paving Slabs)	1.5	7.6 kg / 235 mm diameter	73	67	70	68	73	78	78	77	<b>84</b>
<b>Moving Equipment</b>												
74	Tractor (Towing Equipment) Ж	100	-	79	71	78	75	78	70	61	55	<b>80 Ж</b>
75	Tractor (Towing Trailer) Ж	71	3.5 t	93	86	76	76	73	72	64	59	<b>79 Ж</b>
<b>Power for Site Cabins</b>												
76	Diesel Generator	6.5	-	80	74	57	54	53	48	45	37	<b>61</b>
77	Diesel Generator	-	-	70	62	62	57	53	52	48	41	<b>60</b>
78	Diesel Generator	-	-	64	67	68	65	58	54	49	42	<b>66</b>
79	Diesel Generator	-	-	69	71	68	61	57	51	46	44	<b>64</b>
80	Diesel Generator	-	-	54	64	59	56	55	52	49	45	<b>60</b>
81	Petrol Generator	-	2 t	63	57	58	53	51	46	38	33	<b>56</b>
82	Diesel Generator	-	2 t	64	61	59	53	49	47	42	35	<b>56</b>
83	Diesel Generator	3	210 kg	57	71	65	61	60	56	52	44	<b>65</b>
84	Diesel Generator	-	-	75	72	76	70	69	65	56	47	<b>74</b>

Ж Drive-by maximum sound pressure level in L<sub>max</sub> (Octave Bands) and L<sub>Amax</sub> (Overall Level)

<b>Power for Welder</b>													
85	Diesel Generator	4	18 kg	69	69	67	60	59	60	56	53	<b>66</b>	
<b>Power for Lighting</b>													
86	Diesel Generator	15	-	78	71	66	62	59	55	56	49	<b>65</b>	
87	Diesel Generator	7.5	6 kVA / 3000 rpm	77	72	64	60	59	57	54	42	<b>65</b>	
<b>Pumping Water</b>													
88	Water Pump (Diesel)	10	100 kg	70	65	66	64	64	63	56	46	<b>68</b>	
89	Water Tanker Extracting Water (Vacum Pump)	-	-	81	82	67	72	71	74	73	66	<b>79</b>	
<b>Sweeping &amp; Dust Suppression</b>													
90	Road Sweeper	70	-	80	75	69	75	71	67	61	58	<b>76</b>	
91	Dust Suppression Unit Trailer	-	-	78	73	74	80	70	68	60	56	<b>78</b>	
<b>Miscellaneous</b>													
92	Mounting Supports for Directional Drill (Hydraulic Hammer)	-	-	77	83	73	68	73	80	84	77	<b>87</b>	
93	Angle Grinder (Grinding Steel)	2.3	4.7 kg	57	51	52	60	70	77	73	73	<b>80</b>	
94	Petrol Generator for Hand-held Grinder	3.75	105 kg	77	74	71	70	69	68	66	62	<b>75</b>	
95	Handheld Cordless Nail Gun	-	15 to 50 mm nails	63	65	65	66	65	69	64	61	<b>73</b>	
96	Directional Drill (Generator)	106	-	67	80	74	72	72	72	68	61	<b>77</b>	

**Table 5 Sound level data on road construction works**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB
				63	125	250	500	1k	2k	4k	8k	
<b>Breaking Road Surface</b>												
1	Backhoe Mounted Hydraulic Breaker	67	-	86	80	78	77	81	83	82	81	<b>88</b>
2	Mini Excavator with Hydraulic Breaker	-	(1.5 t) 44 mm diameter / 115 bar / 120 kg	79	75	73	74	77	77	75	70	<b>83</b>
3	Road Breaker (Hand-held Pneumatic)	-	-	82	75	73	68	63	67	80	69	<b>82</b>
4	Road Breaker (Hand-held Pneumatic)	-	-	84	84	74	75	73	77	83	81	<b>86</b>
5	Compressor for Hand-held Pneumatic Breaker	-	1 t	84	73	64	59	57	55	58	47	<b>65</b>
<b>Breaking Concrete</b>												
6	Hand-held Pneumatic Breaker	-	-	90	79	75	78	78	83	91	92	<b>95</b>
<b>Road Planing</b>												
7	Road Planer	185	17 t	81	87	79	77	77	74	70	67	<b>82</b>
8	Road Planer (Idling )	185	17 t	67	59	58	60	59	49	46	38	<b>62</b>
9	Mini Planer	32	3 t	72	67	70	65	62	56	53	48	<b>68</b>
10	Mini Planer (Idling)	32	3 t	67	53	58	50	47	45	42	39	<b>54</b>
<b>Removing Broken Road Surface</b>												
11	Wheeled Excavator	112	17 t	78	74	68	71	68	64	59	52	<b>73</b>
<b>Spreading Chipping/Fill</b>												
12	Dozer	104	14 t	80	78	71	70	74	68	65	61	<b>77</b>
13	Dozer	68	11 t	82	84	76	75	78	76	70	62	<b>82</b>
<b>Earthworks</b>												
14	Bulldozer Ж	250	35 t	77	86	75	75	82	80	73	67	<b>86 Ж</b>
15	Bulldozer Ж	134	24 t	83	81	76	77	82	70	65	58	<b>83 Ж</b>
16	Articulated Dump Truck Ж	194	25 t	88	90	80	79	76	71	65	61	<b>81 Ж</b>
17	Articulated Dump Truck Ж	187	23 t	85	88	77	75	77	74	69	63	<b>81 Ж</b>
18	Tracked Excavator	172	35 t	76	79	75	75	76	73	70	65	<b>80</b>
<b>Rolling and Compaction</b>												
19	Road Roller Ж	95	22 t	87	85	75	73	75	73	69	63	<b>80 Ж</b>
20	Vibratory Roller	98	8.9 t	90	82	73	72	70	65	59	54	<b>75</b>
21	Vibratory Roller Ж	95	12 t	90	84	77	81	73	68	65	61	<b>80 Ж</b>

Ж Drive-by maximum sound pressure level in L<sub>max</sub> (Octave Bands) and L<sub>Amax</sub> (Overall Level)

22	Vibratory Roller Ж	92	12 t	92	83	75	79	77	70	67	61	81	Ж
23	Vibratory Roller (Not Vibrating) Ж	-	12 t	83	77	75	84	76	72	66	61	83	Ж
24	Vibratory Roller Ж	53	12 t	89	82	76	77	72	74	81	61	84	Ж
25	Vibratory Roller	32	4.5 t	80	75	72	75	69	66	62	57	75	
26	Vibratory Roller	-	4 t	84	84	78	70	70	70	67	61	77	
27	Vibratory Roller	20	3 t	85	70	62	62	61	59	53	45	67	
28	Vibratory Roller	12	1.5 t	82	80	76	73	70	70	63	59	77	
29	Vibratory Compacter (Asphalt)	3	60 kg	76	78	74	77	77	77	73	70	82	
<b>Paving</b>													
30	Asphalt Paver (+ Tipper Lorry)	112	12 t hopper	78	77	72	72	71	69	62	56	75	
31	Asphalt Paver (+ Tipper Lorry)	94	18 t	72	77	74	72	71	70	67	60	77	
32	Asphalt Paver (+ Tipper Lorry) Ж	94	18 t	87	84	81	80	79	76	74	65	84	Ж
33	Asphalt Paver (+ Tipper Lorry)	78	18 t	82	82	78	72	69	67	61	54	75	
<b>Trenching</b>													
34	Wheeled Excavator	51	7 t	72	66	62	70	63	62	57	53	70	
35	Tracked Excavator	27	-	82	72	71	69	69	70	61	54	74	
<b>Cutting Concrete Slabs</b>													
36	Hand-held Circular Saw (Petrol)	3	300mm diameter / 9.2 kg	84	86	78	78	77	78	82	80	87	
<b>Lifting Formwork for Underpass</b>													
37	Wheeled Mobile Crane	315	80 t	85	73	67	71	72	69	63	56	76	
38	Wheeled Mobile Crane (Idling)	315	80 t	71	62	57	59	63	60	54	46	66	
<b>Pumping Water</b>													
40	Electric Water Pump	15	6"	71	64	64	67	63	57	54	49	68	

Ж Drive-by maximum sound pressure level in  $L_{max}$  (Octave Bands) and  $L_{Amax}$  (Overall Level)

**Table 6 Sound level data on opencast coal sites**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB
				63	125	250	500	1k	2k	4k	8k	
<b>Breaking Out and Loading</b>												
1	Tracked Excavator	1680	505 t	91	86	80	81	80	78	77	70	<b>85</b>
2	Tracked Excavator	1008	240 t	88	91	87	86	83	81	76	68	<b>89</b>
3	Tracked Excavator	870	213 t	89	92	83	81	82	78	73	65	<b>86</b>
4	Tracked Excavator	382	89 t	86	90	78	74	75	70	62	60	<b>80</b>
5	Tracked Excavator	380	90 t	91	92	83	84	80	78	77	70	<b>86</b>
6	Tracked Excavator	172	35 t	77	80	79	76	76	75	70	63	<b>81</b>
7	Tracked Excavator	128	35 t	84	80	75	74	70	67	64	56	<b>76</b>
8	Tracked Excavator	128	28 t	83	83	77	77	75	72	67	61	<b>80</b>
9	Tracked Excavator	128	23 t	78	85	77	72	69	68	64	61	<b>76</b>
10	Tracked Excavator	107	22 t	83	79	78	76	74	71	65	60	<b>79</b>
11	Tracked Excavator	103	19 t	82	84	75	69	69	67	62	57	<b>75</b>
12	Tracked Excavator	71	13 t	84	74	71	71	68	66	61	55	<b>74</b>
<b>Haulage</b>												
13	Dump Truck Ж	1417	160 t	97	95	91	91	86	84	79	75	<b>92 Ж</b>
14	Dump Truck Ж	783	158 t	89	94	89	85	83	81	76	71	<b>89 Ж</b>
15	Dump Truck Ж	746	90 t	94	91	91	87	84	83	77	70	<b>90 Ж</b>
16	Articulated Dump Truck (Empty) Ж	287	40 t	93	90	85	84	83	81	77	69	<b>88 Ж</b>
17	Articulated Dump Truck Ж	247	28 t	86	84	86	83	79	76	72	67	<b>85 Ж</b>
18	Articulated Dump Truck Ж	240	35 t	91	90	83	83	81	79	70	61	<b>86 Ж</b>
19	Road Lorry (Empty) Ж	320	39 t	81	79	75	70	70	70	68	65	<b>76 Ж</b>
20	Road Lorry (Empty) Ж	313	39 t	81	76	79	70	71	68	64	60	<b>76 Ж</b>
21	Road Lorry (Full) Ж	270	39 t	96	82	74	73	77	72	71	64	<b>80 Ж</b>
22	Road Lorry (Empty) Ж	260	39 t	97	85	81	83	76	71	69	64	<b>83 Ж</b>
23	Rigid Road Lorry Ж	-	-	88	86	80	78	75	73	76	68	<b>82 Ж</b>
<b>Dumping Load</b>												
24	Dump Truck	783	158 t	79	84	81	84	81	80	75	68	<b>86</b>
25	Dump Truck	746	90 t	85	86	86	82	81	79	77	68	<b>86</b>

Ж Drive-by maximum sound pressure level in L<sub>max</sub> (Octave Bands) and L<sub>Amax</sub> (Overall Level)

26	Articulated Dump Truck	287	40 t	88	84	75	73	75	72	68	60	<b>79</b>
27	Articulated Dump Truck	250	51 t	77	77	76	72	71	69	64	54	<b>76</b>
<b>Bulldozing</b>												
28	Crawler Mounted Dozer	354	48 t	80	84	76	77	79	81	69	59	<b>85</b>
29	Crawler Mounted Dozer	250	38 t	83	84	80	77	79	76	86	75	<b>88</b>
30	Crawler Mounted Dozer	250	35 t	79	87	79	78	82	80	73	66	<b>86</b>
<b>Levelling Haul Road</b>												
31	Grader Ж	205	25 t	88	87	83	79	84	78	74	65	<b>86 Ж</b>
<b>Front End Loaders</b>												
32	Wheeled Loader (Loading Hopper)	198	23 t	83	77	70	70	70	68	64	58	<b>75</b>
33	Wheeled Loader (Loading Lorry)	190	25 t	92	84	83	77	76	74	71	62	<b>82</b>
34	Wheeled Loader	184	23 t	82	82	71	73	69	67	66	58	<b>76</b>
<b>Drilling</b>												
35	Tracked Hydraulic Drilling Rig	-	100 mm bore	85	93	78	79	80	79	76	74	<b>86</b>
<b>Diesel Bowser</b>												
36	Diesel Bowser Ж	-	-	80	81	84	81	84	85	76	66	<b>89 Ж</b>
<b>Water Bowser</b>												
37	Water Bowsers (Discharging)	-	-	80	81	75	79	73	74	70	65	<b>81</b>
38	Tractor (Towing Water Bowser) Ж	-	-	78	86	84	78	78	77	70	69	<b>83 Ж</b>
<b>Power for Site Cabins</b>												
39	Diesel Generator	120	150 kVA, 1500 rpm	79	74	67	64	55	51	45	40	<b>65</b>
<b>Pumping Water</b>												
41	Diesel water pump	-	300 kPa / 1645 rpm	83	76	70	73	74	72	65	58	<b>78</b>

Ж Drive-by maximum sound pressure level in  $L_{max}$  (Octave Bands) and  $L_{Amax}$  (Overall Level)

**Table 7 Sound level data on dredging**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, L <sub>Aeq</sub> dB	
				63	125	250	500	1k	2k	4k	8k		
<b>Digging Out River Bed</b>													
1	Long Reach Tracked Excavator	178	21m arm / 39 t	74	83	76	75	70	71	63	57	<b>78</b>	
<b>Dredging Harbour</b>													
2	Grab Hopper Dredging Ship	2461	2136 t	83	91	80	78	78	73	66	58	<b>82</b>	

**Table 8 Sound level data on waste disposal sites**

Ref No.	Equipment	Power rating kW	Equipment size, weight (mass), capacity	Octave Band Sound Pressure Levels (Hz)								A-weighted Sound Pressure Level, $L_{Aeq}$ dB
				63	125	250	500	1k	2k	4k	8k	
<b>Tipping Area</b>												
1	Waste Compactor	392	54 t	70	78	79	72	77	68	66	62	<b>80</b>
2	Waste Compactor	298	-	66	74	78	76	74	70	66	62	<b>79</b>
3	Waste Compactor	283	37 t	79	83	71	75	78	70	67	67	<b>80</b>
4	Waste Compactor	-	-	72	76	76	70	69	67	63	58	<b>75</b>
5	Waste Compactor	226	-	73	75	70	66	68	64	58	50	<b>71</b>
6	Dozer	138	24 t	81	80	75	77	74	69	63	58	<b>78</b>
7	Dozer	138	21 t	73	79	73	72	69	67	61	57	<b>75</b>
8	Dozer	134	50 t	74	76	73	71	71	68	64	58	<b>75</b>
9	Dozer	104	20 t	76	78	71	70	71	65	60	55	<b>74</b>
10	Tracked Excavator	96	24 t	67	70	67	65	63	62	60	55	<b>69</b>
<b>Cell Excavation Area</b>												
11	Tracked Excavator	228	45 t	73	81	75	76	73	70	65	60	<b>78</b>
12	Tracked Excavator	96	24 t	78	80	71	70	68	67	63	58	<b>74</b>
13	Articulated Dump Truck Ж	327	25 t	92	89	83	84	79	75	68	64	<b>85 Ж</b>
14	Articulated Dump Truck Ж	250	23 t	88	84	82	73	75	71	66	60	<b>80 Ж</b>
15	Articulated Dump Truck Ж	227	21 t	91	81	76	77	73	72	70	62	<b>79 Ж</b>
16	Articulated Dump Truck Ж	198	30 t	84	84	81	79	76	73	69	64	<b>81 Ж</b>
17	Dozer	142	20 t	82	88	81	80	75	72	63	57	<b>81</b>
<b>Waste Delivery Vehicles</b>												
18	Refuse Wagon Ж	-	-	82	79	78	75	71	72	66	62	<b>78 Ж</b>
19	Refuse Wagon Ж	283	44 t	88	81	79	76	72	70	64	60	<b>78 Ж</b>
20	Tipper Lorry Ж	-	-	88	82	74	74	74	73	70	67	<b>79 Ж</b>
21	Skip Wagon Ж	-	-	82	84	78	75	71	70	65	59	<b>78 Ж</b>
<b>Pumping Water</b>												
22	Diesel Surface Water Pump	-	4"	70	75	60	58	65	66	59	62	<b>71</b>
23	Diesel Generator for Submersible Pump	-	-	81	73	57	56	52	49	49	42	<b>62</b>
<b>Power for Temporary Site Cabin</b>												
24	Diesel Generator	-	-	82	57	63	48	45	44	40	33	<b>59</b>

Ж Drive-by maximum sound pressure level in  $L_{max}$  (Octave Bands) and  $L_{Amax}$  (Overall Level)