CONTROL OF POLLUTION ACT SECTION 61 PREDICTIONS

Date:	08 August 2018
Subject:	Barratt Homes: NIMR Mill Hill

1.0 Introduction

It is proposed to undertake demolition and construction works at the former buildings of the National Institute of Medical Research, Mill Hill. The London Borough of Barnet Council requires a Control of Pollution Act (CoPA) Section 61 application to be completed prior to the works commencing

The Section 61 requires predictions to be made of likely noise levels resulting from the phases of the construction works. RBA Acoustics have been asked to provide these predictions based on the anticipated programme and methods for demolition and construction.

This document presents the results of the noise predictions for inclusion within the Section 61 application. Guidance on best practicable means to ensure the noisy works undertaken are mitigated as far as possible are also detailed.

2.0 Site Layout

A site plan showing the locations of each construction phase and the location of nearby sensitive receptors is included in Figure 1 appended to this document.

3.0 Construction Proposals

A detailed description of the proposals for the development are contained in Barratt's document Demolition, Construction, Logistics & Environmental Management Plan for the project. A summary of the works as detailed in the construction programme is provided in Table 1 below.

Table 1 – Summary of Construction Programme

Works phase	Duration
Demolition and Enabling works (all phases)	January 2018 – June 2019 (21 weeks)
Phase 1 – Construction of 133 units	May 2018 – June 2019 (55 weeks)
Phase 2 – Construction of 60 units	July 2018 – March 2020 (79 weeks)
Phase 3 – Construction of 59 units	May 2019 – October 2020 (73 weeks)
Phase 4 – Construction of 85 units	November 2019 – July 2021 (78 weeks)
Phase 5 – Construction of 123 units	March 2020 – December 2021 (90 weeks)

Proposed working hours for the site are in line with London Borough of Barnet's regulations i.e.

- Monday to Friday, 8am to 6pm
- Saturday, 8am to 1pm
- Sunday and Bank Holidays, no work allowed

Noisy works out of these hours will require special permission which the contractor shall request from the council.

4.0 Machinery Information

Many of the work phases detailed (e.g. fit out of blocks) are not considered to be problematic in terms of noise and vibration as the works are undertaken manually with hand tools and do not require heavy or otherwise noisy plant. For simplicity, such activities are omitted from this assessment and the predictions are instead focused on those works which are likely to have a high impact on surrounding receptors.

The construction activities involved in the works listed above which are considered to generate high noise emissions have been identified, and details of the proposed machinery to be used by the contractor has been provided to RBA Acoustics for the purposes of the current application. It should be noted that exact plant items have not been confirmed for all activities and so some sound power ratings of plant to be used are currently not known.As such the database of plant sound levels included in BS5228:2009 – Part 1 has been referenced for the assessment where necessary.

The noise levels predicted are not expected during every day of the construction period, but rather only when there are intense periods of activity and the works are not screened from sensitive locations by other buildings or structures. As such this assessment represents a worst case description of the predicted noise levels.

5.0 Receptors

The closest existing residential and commercial properties to the construction phase sites have previously been identified in the Environmental Statement. These are summarised in the below table, and are also referenced on Figure 1 at the end of this document:

Table 2 – Noise sensitive receptors

Receptor ID	Receptor	Description of location	Distance from site boundary (m)
1	Residential properties on St Vincents Lane	To the west of the site on the west side of St Vincents Lane	50
2	Residential properties on The Ridgeway (Fir Island)	Adjacent to the east of the site, on the north side of The Ridgeway	40
3	Residential properties on The Ridgeway (Wentworth Hall)	To the south of the site, on the south side of The Ridgeway	40
4	Residential properties on Burtonhole Lane	To the east of the site, on the east side of Burtonhole Lane	20
5	Commercial premises - Pond Life Aquatics	To the north of the site, in Finchley Nurseries on the west side of Burtonhole Lane	45

6.0 Construction Noise & Vibration Predictions

Indicative noise levels have been predicted at the nearest sensitive locations using the methodology set out in BS 5228. Several mitigation measures detailed in Section 8.0 have been included in the calculations, including:

- Selection of plant models with low sound output levels;
- Siting of stationary plant away from sensitive receptors and limiting time that mobile plant is operating near sensitive receptors (this has been accounted for in the calculations by using the distance from the receiver to the site centre rather to than the site boundary);
- Reducing daily 'on-time' of items of plant;
- Using local screening (e.g. acoustic barriers) for stationary plant, where possible;
- Using covers on chains of skip trucks

The approach taken is to use the sound power level of the equipment and then calculate the noise level at the point of interest by applying corrections to account for distances from the source to the receiver, mitigation measures applied and other factors. One factor considered is an estimation of the 'on-time' of each item of equipment – i.e. the percentage of the 10 hour daytime assessment period in which the equipment will be in use during the phase of work. On-times used in the calculations for this application have been based on information provided by the contractor. Detailed calculations for noise predictions are provided in the tables in Appendix 1. Table 3 below provides a summary of the predictions for each phase.

Table 3 – Noise prediction calculations

Phase	Nearest receptor	Total predicted noise for phase (dB(A), $L_{eq, 10h}$)
Demolition	4	69
Enabling	4	69
Phase 1 Substructure	1	67
Phase 1 Superstructure	1	66
Phase 2 Substructure	2	65
Phase 2 Superstructure	2	64
Phase 3 Substructure	4	59
Phase 3 Superstructure	4	58
Phase 4 Substructure	1	67
Phase 4 Superstructure	1	67
Phase 3 Substructure	*5*	*63*
*Phase 3 Superstructure**	*5*	*62*
Phase 5 Substructure	3	65
Phase 5 Superstructure	3	65

*Note that while receptor ID 5 (Pond Life) is not the nearest receptor during any phase of the works, calculations show that the highest impact at this receptor will be during Phase 3 works

The calculation tables in Appendix 1 show the plant items predicted to have the highest impact during the works. As well as mitigation measures advised in this report, effective liaison with nearby receptors is also required to advise when such works are taking place and to inform that such works are unavoidable but will be limited in duration. It is recommended that the contractor is engaged in proactive communication with local residents through regular letter drops and open, responsive channels of communication clearly advertised on the site hoarding or at the site entrance.

7.0 Vibration

There are two types of vibration impact that need consideration: the effects on people or equipment within buildings and the effect on buildings (or other structures) themselves.

The level at which vibration is perceptible / annoying to occupants is much lower than that required to result in cosmetic damage. Typically vibration limits of PPV 1-2mm/s are considered appropriate for assessing occupant comfort whereas PPV 15mm/s is typically adopted as the limit for cosmetic damage to buildings.

It is not possible to accurately quantify the impact of such works at this stage, however it is recommended that in the first instance, demolition and piling work methods which result in the lowest levels of impact to the structures are adopted.

Controlled vibration tests should also be undertaken whereby vibration levels are manually monitored during initial / example works (such as piling and excavation) to determine the levels of vibration within the adjacent properties.

8.0 Mitigation

The London Borough of Barnet Council provides guidelines for noise from construction sites, including several mitigation measures that should be adopted by the contractor for the current assessment. The following extract is taken from the Council's document 'Construction site guidelines for householders and developers':

"Noise and vibration must be kept to a minimum by methods of work that conform with the 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (See BS 5228 Parts 2 and 4: 1997, and EC and UK Noise Legislation, as applicable). At all times the best practicable means as defined in the Act must be employed to reduce noise. Only the quietest plant or machinery should be used, and all equipment should be maintained in good mechanical order and fitted with appropriate silencers, mufflers or acoustic covers. Stationary noise sources should be sited as far away as possible from neighbouring properties. Acoustic barriers consisting of site materials such as bricks, earth mounds or proprietary types should be constructed when noise cannot be sufficiently reduced by careful siting of noise sources. Piling should be carried out by methods causing minimum noise and vibration. All workers on site must be made aware of the need to keep noise and disruption to a minimum from building works, equipment, plant and machinery, radios, music, vehicles or any other sources. The movement of vehicles to and from the site must be controlled to minimise noise and disturbance to nearby residents."

The contractor will adopt these mitigation measures to ensure disruption to local sensitive receptors is as low as can be practically achieved. In addition the specific measures listed in the above extract, measures to mitigate noise and vibration include:

- The use of acoustic barriers and enclosures where appropriate, particularly if there are any stationary equipment requirements;
- Use of covers on chains of skip trucks to muffle noise;
- Use of electric and electro-hydraulic plant and equipment where practical;
- Switching off engines when not in use;
- Use of non-percussive tools and equipment where practical;
- Off-site steel and services prefabrication to limit the welding and cutting of materials on-site;

- Hydraulic construction to be used in preference to percussive techniques where practical;
- Off-site prefabrication to be used, where practical
- All plant and equipment to be used for the works to be properly maintained, silenced where appropriate and operated to prevent excessive noise and switched off when not in use and where practicable;
- Plant to be certified to meet relevant current legislation and BS5228 standards;
- All trade contractors to be made familiar with current legislation and the guidance in BS5228;
- A system to be set up to handle noise complaints, which are to be immediately investigated upon being received by the contractor.

9.0 Monitoring

Noise monitoring is proposed to be undertaken throughout the duration of the demolition and construction programme using typical unattended, continuous semi-permanent noise monitors with SMS/email alert systems.

Data obtained from the noise monitors will be used to assess any noise impacts arising as a result of the demolition and/or construction works. SMS/email alerts will be sent to the relevant personnel (e.g. site manager) upon exceedance of a pre-defined trigger level. In section E.2, BS 5228: Part 1 recommends that for 'suburban and urban areas away from main road traffic and industrial noise', 70 dB(A) $L_{eq,}$ is an appropriate daytime limit, and so this is proposed as a trigger level for general works. For higher impact works where an exceedance of this value is likely at the closest residential properties, making residents aware of the works in advance is recommended to minimise the risk of complaints.

Results will be analysed and data reports subsequently issued on a regular basis.

Precise monitoring locations would be determined with regard to available secure locations and nearby noise sensitive premises, but noise levels would typically be assessed at 1m from the nearest noise sensitive façade. As the construction phase develops, it is anticipated that the noise monitors will be relocated to assess noise at the new residential properties following their construction and occupation. Different levels or measurement periods may be applied according to circumstances. If required, short term attended monitoring will be undertaken if complaints are made that are away from the fixed monitoring locations.

Sound levels will be monitored according to the methods set out in Appendix B of BS 5228: Part 1. All measurements will be made on a sound level meter complying with BS 5969:1981 (1989), Specification for Sound Level Meters.

Vibration monitoring will also be undertaken at locations and over periods to be agreed, with regular reports provided.

Peak Particle Velocity (PPV) levels in excess of 1 mm/s may be considered to represent a significant impact on the occupants of residential buildings; and 2 mm/s for commercial premises (although higher levels may be tolerated in certain instances). Where vibration monitoring is required, measurements and calibration of equipment shall be made following the guidance in BS 5228-2:2009+A1:2014.

Vibration limits for the works are as shown below:

- 1mm/sPPV for occupied residential and educational buildings
- 3mm/sPPV for occupied commercial premises where work is not of an especially vibration sensitive nature or for potentially vulnerable unoccupied buildings
- 5mm/sPPV for other unoccupied buildings.

NIMR S61
Site phase layout
7732

Figure 1

Not to Scale

RBA ACOUSTICS

Appendix 1 – Noise prediction calculations

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Demolition	Excavator	C4.10		80	94	4	75	51	**69**
	Excavator	C4.10		80	94		75	51	
	Excavator	C4.10		80	94		75	51	
	Excavator	C4.10		80	94		75	51	
	Excavator	C4.10		80	94		75	51	
	Breaker		Use low noise breaker e.g. HILTI TE905 AVR	20	96		75	47	
	Breaker		Use low noise breaker e.g. HILTI TE905 AVR	20	96		75	47	
	Crusher	C1.14		50	110		75	64	
	Crusher	C1.14		50	110		75	64	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		75	55	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		75	55	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		75	55	
	Waste Disposal Truck	C8.18		10	106		75	53	
	Waste Disposal Truck	C8.18		10	106		75	53	
	Air Compressor	D7.13		2	92		75	44	
	Skip Truck	C8.21	Use skip chain covers	50	86		75	40	
Enabling	Excavator	C4.10		80	94	4	75	51	**69**
	Excavator	C4.10		80	94		75	51	
	Excavator	C4.10		80	94		75	51	
	Breaker	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	80	96		75	53	
	Crusher	C1.14		80	110		75	67	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	20	101		75	52	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	20	101		75	52	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		75	55	
	Waste disposal truck	C8.18		50	106		75	60	
	Waste disposal truck	C8.18		50	106		75	60	
	Air compressor	D7.13		50	92		75	46	
	Skip Truck	C8.21	Use skip chain covers	50	86		75	40	
	Roller	C2.38		10	101		75	48	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 1 Substructure	Excavator	C4.10		80	94	1	60	52	**67**
	Excavator	C4.10		80	94		60	52	
	Breakers	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	10	96		60	45	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		60	57	
	Waste disposal truck	C8.18		10	106		60	55	
	Air compressor	D7.13		5	92		60	38	
	Skip truck	C8.21	Use skip chain covers	10	86		60	35	
	Mobile crane	C3.30		5	98		60	44	
	Auger piling rig	C3.16		50	107		60	63	
	Mobile access platform	C4.57		5	95		60	41	
	Delivery truck	C6.21		25	108		60	61	
	Cutting tool	C4.72	Use acoustic barriers	50	97		60	53	
Phase 1 Superstructure	Forklift truck	D7.94	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	75	97	1	60	55	**66**
	Cutting tool	C4.72	Use acoustic barriers	50	97		60	53	
	Dumper	C4.9	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	10	101		60	50	
	Waste disposal truck	C8.18		10	106		60	55	
	Air compressor	D7.13		10	92		60	41	
	Skip Truck	C8.21	Use skip chain covers	50	86		60	42	
	Mobile crane	C3.30		75	98		60	56	
	Mobile access platform	C4.57		5	95		60	41	
	Delivery truck	C6.21		50	108		60	64	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 2 Substructure	Excavator	C4.10		80	94	1	75	51	**65**
	Excavator	C4.10		80	94		75	51	
	Breakers	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	10	96		75	43	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		75	55	
	Waste disposal truck	C8.18		10	106		75	53	
	Air compressor	D7.13		5	92		75	36	
	Skip Truck	C8.21	Use skip chain covers	50	86		75	40	
	Mobile crane	C3.30		5	98		75	42	
	Auger piling rig	C3.16		50	107		75	61	
	Mobile access platform	C4.57		5	95		75	39	
	Delivery truck	C6.21		25	108		75	59	
	Cutting tool	C4.72	Use acoustic barriers	50	97		75	51	
Phase 2 Superstructure	Forklift truck	D7.94	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	75	97	1	75	53	**64**
	Cutting tool	C4.72	Use acoustic barriers	50	97		75	51	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	10	101		75	48	
	Waste disposal truck	C8.18		10	106		75	53	
	Air compressor	D7.13		10	92		75	39	
	Skip Truck	C8.21	Use skip chain covers	50	86		75	40	
	Mobile crane	C3.30		75	98		75	54	
	Mobile access platform	C4.57		5	95		75	39	
	Delivery truck	C6.21		50	108		75	62	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 3 Substructure	Excavator	C4.10		80	94	4	150	45	**59**
	Excavator	C4.10		80	94		150	45	
	Breakers	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	10	96		150	37	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		150	49	
	Waste disposal truck	C8.18		10	106		150	47	
	Air compressor	D7.13		5	92		150	30	
	Skip Truck	C8.21	Use skip chain covers	50	86		150	34	
	Mobile crane	C3.30		5	98		150	36	
	Auger piling rig	C3.16		50	107		150	55	
	Mobile access platform	C4.57		5	95		150	33	
	Delivery truck	C6.21		25	108		150	53	
	Cutting tool	C4.72	Use acoustic barriers	50	97		150	45	
Phase 3 Superstructure	Forklift truck	D7.94	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	75	97	4	150	47	**58**
	Cutting tool	C4.72	Use acoustic barriers	50	97		150	45	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	10	101		150	42	
	Waste disposal truck	C8.18		10	106		150	47	
	Air compressor	D7.13		10	92		150	33	
	Skip Truck	C8.21	Use skip chain covers	50	86		150	34	
	Mobile crane	C3.30		75	98		150	48	
	Mobile access platform	C4.57		5	95		150	33	
	Delivery truck	C6.21		50	108		150	56	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 4 Substructure	Excavator	C4.10		80	94	2	60	52	**67**
	Excavator	C4.10		80	94		60	52	
	Breakers	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	10	96		60	45	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		60	57	
	Waste disposal truck	C8.18		10	106		60	55	
	Air compressor	D7.13		5	92		60	38	
	Skip Truck	C8.21	Use skip chain covers	50	86		60	42	
	Mobile crane	C3.30		5	98		60	44	
	Auger piling rig	C3.16		50	107		60	63	
	Mobile access platform	C4.57		5	95		60	41	
	Delivery truck	C6.21		25	108		60	61	
	Cutting tool	C4.72	Use of local screening reduce levels by 10 dB	50	97		60	53	
Phase 4 Superstructure	Forklift truck	D7.94	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	75	97	2	60	55	**67**
	Cutting tool	C4.72	Use acoustic barriers	50	97		60	53	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	10	101		60	50	
	Waste disposal truck	C8.18		10	106		60	55	
	Air compressor	D7.13		10	92		60	41	
	Skip Truck	C8.21	Use skip chain covers	10	106		60	55	
	Mobile crane	C3.30		75	98		60	56	
	Mobile access platform	C4.57		5	95		60	41	
	Delivery truck	C6.21		50	108		60	64	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 5 Substructure	Excavator	C4.10		80	94	3	70	51	**66**
	Excavator	C4.10		80	94		70	51	
	Breakers	D2.10	Use low noise breaker e.g. HILTI TE905 AVR	10	96		70	44	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	50	101		70	56	
	Waste disposal truck	C8.18		10	106		70	54	
	Air compressor	D7.13		5	92		70	37	
	Skip Truck	C8.21	Use skip chain covers	10	86		70	34	
	Mobile crane	C3.30		5	98		70	43	
	Auger piling rig	C3.16		50	107		70	62	
	Mobile access platform	C4.57		5	95		70	40	
	Delivery truck	C6.21		25	108		70	60	
	Cutting tool	C4.72	Use acoustic barriers	50	97		70	52	
Phase 5 Superstructure	Forklift truck	D7.94	Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))	75	97	3	70	54	**65**
	Cutting tool	C4.72	Use acoustic barriers	50	97		70	52	
	Dumper	C4.9	Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)	10	101		70	49	
	Waste disposal truck	C8.18		10	106		70	54	
	Air compressor	D7.13		10	92		70	40	
	Skip Truck	C8.21	Use skip chain covers	10	86		70	34	
	Mobile crane	C3.30		75	98		70	55	
	Mobile access platform	C4.57		5	95		70	40	
	Delivery truck	C6.21		50	108		70	63	

Phase	Plant / process allocated to Task	BS:5228 Reference	Mitigation Measures	% of Time In Use*	Sound Power Level (dB)	Nearest receptor ID	Distance from works To Receptor (m)	Noise at Receptor (dB)	**Total for Phase (dB)**
Phase 3 Substructure	*Excavator*	*C4.10*		*80*	*94*		*100*	*48*	***63***
	Excavator	*C4.10*		*80*	*94*	*5*	*100*	*48*	
	Breakers	*D2.10*	*Use low noise breaker e.g. HILTI TE905 AVR*	*10*	*96*		*100*	*41*	
	Dumper	*C4.9*	*Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)*	*50*	*101*		*100*	*53*	
	Waste disposal truck	*C8.18*		*10*	*106*		*100*	*51*	
	Air compressor	*D7.13*		*5*	*92*		*100*	*34*	
	Skip Truck	*C8.21*	*Use skip chain covers*	*10*	*86*		*100*	*31*	
	Mobile crane	*C3.30*		*5*	*98*		*100*	*40*	
	Auger piling rig	*C3.16*		*50*	*107*		*100*	*59*	
	Mobile access platform	*C4.57*		*5*	*95*		*100*	*37*	
	Delivery truck	*C6.21*		*25*	*108*		*100*	*57*	
	Cutting tool	*C4.72*	*Use acoustic barriers*	*50*	*97*		*100*	*49*	
Phase 3 Superstructure	*Forklift truck*	*D7.94*	*Use low noise model e.g. STILL (RX 70-22 T, RX 70-25 T, RX 70-30 T, RX 70-35 T) (dB(A))*	*75*	*97*	*5*	*100*	*51*	***62***
	Cutting tool	*C4.72*	*Use acoustic barriers*	*50*	*97*		*100*	*49*	
	Dumper	*C4.9*	*Use low noise model e.g. Terex Dumpers (e.g. TA1EH, TA3, TA3S etc.)*	*10*	*101*		*100*	*46*	
	Waste disposal truck	*C8.18*		*10*	*106*		*100*	*51*	
	Air compressor	*D7.13*		*10*	*92*		*100*	*37*	
	Skip Truck	*C8.21*	*Use skip chain covers*	*10*	*86*		*100*	*31*	
	Mobile crane	*C3.30*		*75*	*98*		*100*	*52*	
	Mobile access platform	*C4.57*		*5*	*95*		*100*	*37*	
	Delivery truck	*C6.21*		*50*	*108*		*100*	*60*	