

The logo for O'KEEFE, featuring the name in white, bold, sans-serif capital letters on a red rectangular background. Above the red background is a thin black horizontal line.

O'KEEFE

**Control
of
Demolition Noise and Vibration**

**100 Avenue Road
Swiss Cottage**

A Project for

Essential Living

Document Control

Document Reference	D001-NV-001
Status	For Approval
Revision	A
Date Revised	
By	David Foley
Date Checked	
By	
Revision	A
Date Revised	12/03/2018
By	
Date Checked	
By	
Date Of First Issue	20 th August 2017
Date Revised	12/03/2018
By	David Foley
Date Checked	
By	
<i>Originators Notes</i>	Revised to comments

Contents

1. Introduction	Pg 4
2. Site Description and Constraints	Pg 4
3. Scope of Works	Pg 5
4. Soft Strip Works	Pg 5
5. Structural Demolition	Pg 6
6. Objectives	Pg 6
7. Monitoring Strategy/Details	Pg 8
8. Site Action Levels	Pg 10
9. Predicted Levels	Pg 11
11. Vibration Levels	Pg 11

Table C1 Sound Level Data on Demolition

Table C2 Real Time Vibration Monitor Location

Table C3 Real Time Noise Monitor Location

Table C4 Noise Acoustic Panels to 100 Avenue Road

1. Introduction

This document has been prepared to describe the proposed strategy for the monitoring of Noise and Vibration during the demolition works associated with Project Falcon. The site has been classified as a high risk project based on the Mayor's best practice guide.

The document covers the following items:-

- Outline description of the demolition works
- Monitoring Strategy
- Mitigation Measures
- Proposed Monitoring Locations

In producing the methodology we have considered the following points and have detailed our method of mitigation for each instance. Our proposed methods have considered all points mentioned below.

- Noise, dust and vibration emitted from our Hard Demolition works.
- Monitoring regime which we will manage throughout our works, which will then allow us to determine if certain activities are generating excessive noise, dust or vibration. If necessary we will then tailor our working practices to suit.
- The selection of plant and equipment for the project can significantly affect our impact on the adjacent tenants, we will utilise the latest plant and equipment at all times to mitigate any unnecessary noise and vibration.

2. Site Description/Constraint

The site is located at 100 Avenue Road, Swiss Cottage, London, which is busy at all times of the day and night. The location is between the A41, College Crescent and Winchester Road, with the entrance to Swiss Cottage underground Station adjacent to the building. The proposed works are being carried out in a domestic residential, commercial and retail environment which is also busy at all times of day and night with pedestrians and vehicles particularly in peak times. The area is controlled by Camden Council.

The site is to be served primarily from the public highway access on Avenue Road for the erection of scaffolding hoardings and the demolition works. The two entrances to the London underground station must be kept clear at all time with approved (TFL & London Underground) scaffolding protection or similar.

Special deliveries of heavy plant, machinery and cranes will be carried out during pre-arranged quiet periods (outside of rush hour times). Footpaths are to be adequately protected where required and kept clean at all times.

3. Scope of Works

The scope of works under the Essential Living demolition project is for the controlled demolition of 100 Avenue Road. Following is a brief summary of the scope of works for the project, which outlines the activities which may lead to dust emission.

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Soft Strip of the Building

The soft strip works includes, but is not limited to, the removal of the following items:-

- Remaining tenant's waste, furniture and fittings
- Internal timber or metal stud partitions and blockwork walls
- Internal doors and frames and associated ironmongery
- Suspended ceilings, including supports and suspension grids
- Floor coverings, carpets, and vinyl
- Raised floors
- Perimeter trunking, radiators, ductwork, pipes, wires, cables, distribution boards and hot and cold water supplies
- Sanitaryware to male and female toilets and shower rooms.

All the above materials will be removed from the existing structures via the existing internal access down onto the ground floor via pre-installed waste chutes where they will be removed from the building out to the external waste storage area it will then be loaded into roll on/off bins ready for carting away from site. All waste will be removed daily from the site the storage area will be cleared at the end of the working day.

4. Structural Demolition

The Structural Demolition works include the following tasks:-

- Carefully take down the building to the existing ground floor slab utilising a “Floor by Floor” methodology using mini excavators, with all debris arising being removed from the floors using an internal waste chute where it can then be removed from the building at the ground floor level into wait and load tipper trucks.
- During the demolition process water will be continually sprayed over the demolition arising's to prevent dust migration escaping the site boundary's, water will also be sprayed over the demolition waste when it is been loaded into tipper lorries
- The structure is a reinforced concrete construction consisting of a precast concrete floor biscuit, spanning between columns with an insitu RC topping. The foundations of the building are ground bearing beams cast on top of piles and pile caps
- During the demolition works the lower ground floor will be back propped for the follow-on sheet piling works
- The lower ground floor area will be removed during the main excavation works for the installation of the pile mat and piling works. these works will commence after the sheet piling has been installed

5. Objectives

Best Practicable Means' (BPM) (as outlined in Section 72 of the Control of Pollution Act 1974) will be employed in order to minimise noise and vibration levels throughout the period of the works.

The following specific noise control measures have been planned by O'Keefe Demolition for this site:

- Wherever possible use hydraulic concrete “muncher” attachments instead of breakers (munchers are significantly quieter than breakers). The selection of this method is based on successful outcomes on other projects in the vicinity;
- Forming separation cuts between site activities and neighbours, to minimise the transfer of structure borne noise and vibration;
- Cutting and lifting of slab sections wherever possible instead of breaking and discharging. In practice this will apply mainly to the floor. This method has been used successfully on other projects in the vicinity;

- Investigation of local screening / insulation at appropriate locations, (e.g. of Noise insulation using Soundex Panels, with appropriate absorptive / insulating materials.
- SOUNDEX™ is the leading brand in noise control that is fast, simple and effective. Up to 32 dB reduction in noise Fire & water resistant Quick erection and easily transportable Suitable for both short and long term projects Tested and certified to: BS EN ISO 717-1 : 1997; BS EN ISO 345 : 2003; EN ISO 11654 : 1997 Ideal for effective noise control from demolition works Non-irritant acoustic material with no glass-fibre content VELCRO connections to ensure optimum acoustic performance.
- Phase the demolition works to ensure that the noisier activities are not carried out concurrently;
- Where necessary, staff will be trained on the importance in adhering to Best Practicable Means.
- Regular contact with our neighbours to ensure that works are not causing unacceptable impact on their environment and, wherever possible, schedule work activities to suit any specific quiet periods that our neighbours may require.
- The noise and vibration control procedures set out in BS 5228 Parts 1 and Noise and Vibration Control on Construction and Open Sites will be adopted.

6. Monitoring Strategy/Details

General measures will include the following as appropriate:

- Careful selection of plant, demolition methods and programming. Only plant conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions will be used
- Design and use of site hoardings and screens, where practicable and necessary, to provide acoustic screening at the earliest opportunity;
- Where practicable, doors and gates will not be located opposite occupied noise sensitive buildings. The mechanisms and procedures for opening doors/gates will minimise noise as far as reasonably practicable;
- Demolition plant will be located, as far as is reasonably practicable, away from adjacent occupied buildings or as close as possible to noise barriers or site hoardings where these are located between the plant and the buildings;
- Static and semi-static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures where practicable;
- Personnel will be instructed on BPM to reduce noise and vibration as part of their induction;
- Training and as required prior to specific work activities;
- When plant is not being used, it shall be shut down and not left to idle.

The method statement indicates that the buildings are isolated from adjacent buildings. Therefore, the transmission path for direct vibration effects will be minimised. This, combined with the use of non-percussive breaking techniques where practicable will constitute reducing vibration by best practicable means.

Information leaflets will be distributed to affected parties in advance of the works commencing. It is relevant to note that O'Keefe maintain a very good track record in the Essential Living and aims to maintain this position.

A regime of noise and vibration monitoring will be implemented, with the purpose of Identifying noise and vibration impacts, demonstrating that Best Practicable Means is adhered to, investigating complaints and generally assisting with the control of noise and vibration.

Monitoring and storage of measured data is to cover the complete duration of normal working hours during which equipment or machinery may operate on site, as identified in the voluntary Section 60 Agreement proposal.

We will install and manage our works with real time monitoring equipment, which will then allow us to determine if certain activities are generating excessive noise, dust or vibration. If necessary we will then tailor our working practices to suit.

- The selection of plant and equipment for the project can significantly affect our impact on the adjacent tenants, we will utilise the latest plant and equipment at all times to mitigate any unnecessary noise and to minimise the dust emission.

As a minimum, monitor and record sound level in terms of LAeq (5min) values, LAeq (1hr), LAeq (12hr). Values for LA01 and LA90 shall also be provided from the short LAeq samples.

It is intended that monitoring will be undertaken externally to minimise uncertainty that can arise from measurements taken internally.

The attended monitoring reporting will be carried out on a weekly basis. Any relaxation to this sampling frequency will be agreed with the client (by way of email) in advance of any proposed changes to the sampling frequency.

Additional attended monitoring may be carried out at a higher sampling frequency or at additional locations either upon the reasonable request of the local authority or following noise complaints.

Monitoring will be carried out during working hours and data will be logged and recorded.

The continuous Noise and vibration monitoring equipment will incorporate an alert system which will allow instant notification should specified threshold values be exceeded

Vibration monitoring will be undertaken in 3 orthogonal axes and used to control vibration magnitudes so that a PPV threshold of 1 mm/s in the vertical axis is not exceeded, as far as reasonably practicable.

It is acknowledged that, for assessing human response to vibration, monitoring should be undertaken at the point of entry to the human body within buildings.

However, for this monitoring strategy, vibration measured either close to or at the base of the building will be used and transfer functions applied where necessary to ensure that the measured vibration levels are representative of actual exposure.

All monitoring will be undertaken by competent and experienced staff, which will be given the requisite health and safety training and site access when required.

Measurements will be taken while site operations are active during the stated working hours, provided access to monitoring locations at these times is possible.

The sound level meter used shall be a Class 1 integrating sound level meter, complying with BS EN 61672:2003. The field calibrator shall comply with BS EN 60942:2003. The meter and calibrator will have been calibrated in a UKAS accredited

laboratory; the sound meter will be calibrated every 2 years and the calibrator every year

- CR:245/3 Type 1 system Noise Monitoring Terminal with
- MK: 245 Outdoor Microphone / MK: 404 Electrostatic Actuator systems for automatic calibration.
- GSM Modem for remote access./ Noise Hub software.

7. Site Action Levels

The noise and vibration measurements will be used to:

- Verify whether all Best Practicable Means are being used to control noise and vibration levels;
- Investigate any noise or vibration complaints;
- Compare the measured vibration against a PPV threshold of 1 mm/s

Where the results of the noise or vibration monitoring indicate that demolition noise levels exceed the worst case predicted noise levels or vibration levels exceeding a PPV of 2 mm/s, O'Keefe will:

- In the case of vibration, measured vibration levels shall be compared with the criteria in BS 5228: 2009 part 2 (i.e. 1mms^{-1} PPV for potential disturbance in residential and using a suggested trigger criteria of 2mms^{-1} for commercial). Lower limits must be agreed with the Council if there is a risk that vibration levels may interfere with vibration sensitive equipment or other vibration sensitive objects

- Review the noise and vibration monitoring results to determine as far as is reasonably practicable the activities/ plant responsible
- Ascertain and implement any reasonably practicable means of reducing the measured construction noise levels by 3dBA or more or reduce vibration to below 5 mm/s;
- Prepare an incident/complaint investigation note using agreed template formats Issue the incident/ complaint investigation note within 2 working days after completion of the investigation
- Issue a response to the complainant within 5 working days from receipt of the complaint

8. Predicted Values

The predicted noise levels relate to the percent on time, source sound level, distance to the nearest property and any screening.

The estimated value for breaking out is very high at 85dB LAeq (10hr), but assumes no significant screening benefits and will apply to a relatively limited area of the works. In practice some screening is likely to be achievable for most overlooking locations, for example by bringing hoarding up close to the work line and this would be expected to achieve at least 5dB reduction. Meeting the 75dB LAeq (10hr) limit value through limitation on working time would be unrealistic (10 minutes working time).

It is relevant to note that the worst case levels (ie, when working nearest to affected properties and at the edge of the site where least screening and distance loss occurs) would be expected to occur for approximately 20% of the project duration.

9. Vibration Levels

Careful management of onsite activities will help to mitigate vibration impact. These management measures may include: selection of plant, timing of activities in consultation with the occupiers of the properties and monitoring vibration levels.

It is considered that structurally attached receptors represent the most sensitive receptors. In risk terms it is considered that there may be periods when values in excess of 5 mm/s are experienced at these locations.

Guidance within BS 5228 can be used to produce predictions of vibration levels due to piling activities. It also gives details of what levels of vibration can be expected to give rise to effects for building occupiers. A table of these vibration effects is given below.

In accordance with BS 5228-2: 2009 Code of practice for noise and vibration control on construction and open sites – Part 2 Vibration, 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 (although higher levels may be tolerated in certain instances). A higher level may be expected for commercial premises. In line with, BS6472, which suggests that the tolerance levels for commercial may be double that for residential, Peak Particle Velocity (PPV) levels in excess of 2 mm/s may be considered to represent a significant impact on the occupants of residential buildings.

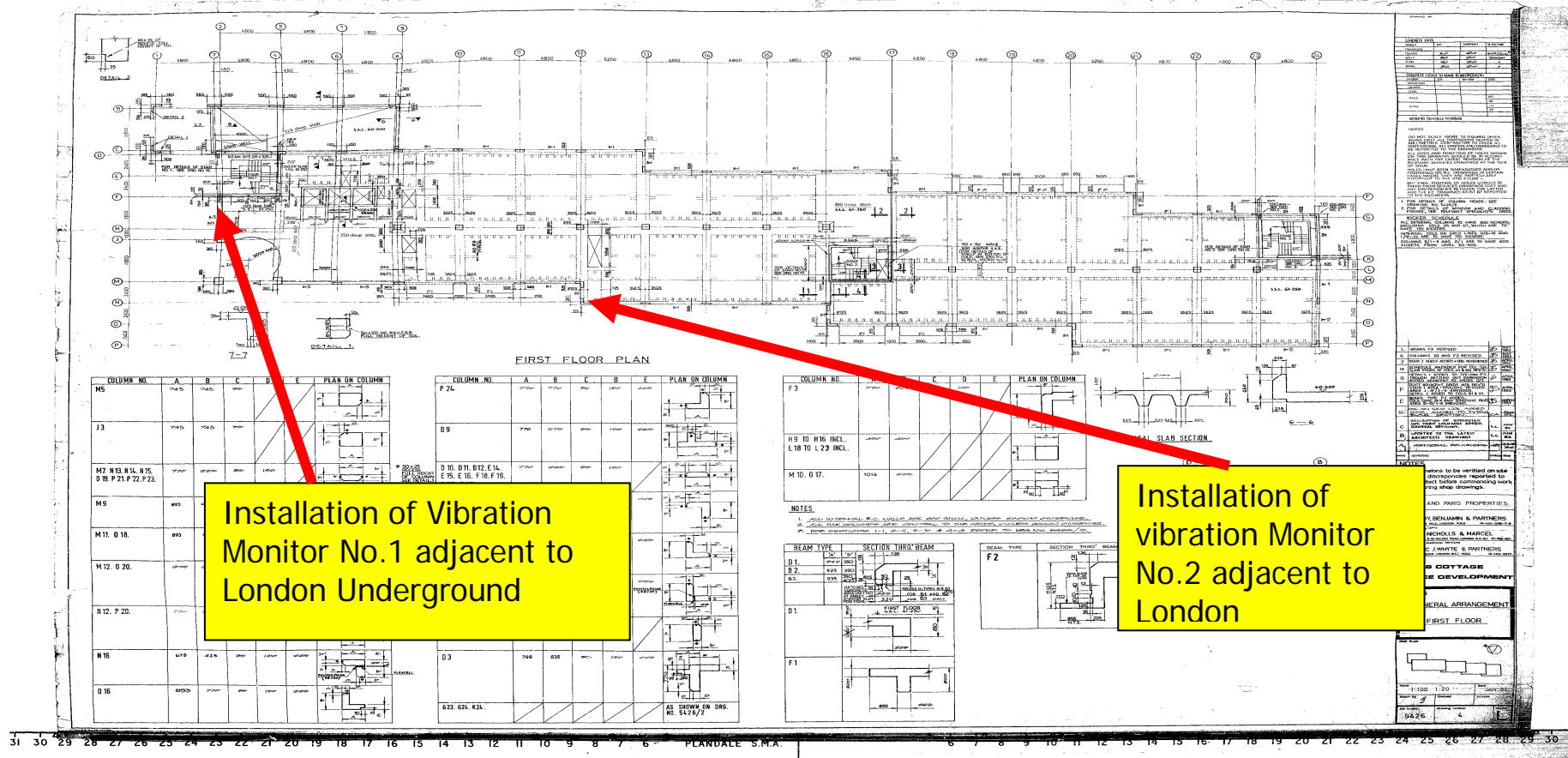
Levels in excess of 1 mm/s may be considered to represent a significant impact on the occupants of residential buildings and a level of 2 mm/s for commercial. Consequently, personnel will inform occupants in advance of the works taking place. Notification will be via a leaflet drop which will inform potentially affected residents of the likely start date of the works and the duration. The notification will be in accordance with the guidance and advice presented in Sections 4 and 6.3 of BS 5228-2:2009.

Table C.1 Sound level data on demolition

Ref no.	Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Octave band sound pressure levels at 10 m, Hz								A-weighted sound pressure level, L_{Aeq} dB at 10 m
				63	125	250	500	1k	2k	4k	8k	
Breaking up concrete												
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	92
2	Breaker mounted on wheeled backhoe	—	380 kg / 1700 mm tool / 74 mm dia. / 125 bar	79	84	82	84	88	85	84	82	92
3	Pulverizer mounted on excavator	—	—	85	76	74	75	74	75	70	65	80
4	Pulverizer mounted on excavator	147	30 t	75	72	71	73	70	69	66	59	76
5	Pulverizer mounted on excavator	143	29 t	73	73	69	70	67	64	58	51	72
6	Hand-held pneumatic breaker	—	—	83	83	81	74	73	76	78	77	83
7	Hand-held hydraulic breaker	—	20 kg / 69 bar	82	81	87	87	88	86	83	87	93
8	Hydraulic breaker power pack	6	63 kg / 138 bar	77	72	73	69	68	66	64	60	74
Breaking up brick foundations												
9	Breaker mounted on excavator	121	(15 t) 1 650 kg breaker	88	88	86	89	83	83	80	76	90
Dumping brick rubble												
10	Tracked excavator (loading dump truck)	228	44 t	82	78	82	81	81	78	72	64	85
11	Articulated dump truck (dumping rubble)	250	28 t	94	76	77	75	76	73	68	63	80
Breaking and spreading rubble												
12	Tracked excavator	228	44 t	79	81	83	79	77	75	70	62	82
13	Tracked excavator	205	40 t	81	80	80	83	82	79	76	73	86
Crushing concrete/rubble												
14	Tracked crusher	172	47 t	93	86	79	81	75	71	66	59	82
15	Tracked crusher	—	—	86	84	84	81	78	75	71	66	84
Breaking up/cutting steel												
16	Tracked excavator	205	40 t	75	74	77	80	78	74	67	61	82
17	Tracked excavator	74	14 t	79	77	76	77	78	78	73	66	83
18	Gas cutter	—	—	72	72	69	72	73	72	71	71	79
Breaking stud partition												
19	Lump hammer	—	—	66	66	68	68	63	57	55	51	69
Breaking windows												
20	Lump hammer	—	—	77	75	71	72	74	74	75	73	81

Table C3

Location of Real Time Vibration Monitors



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Checked:

Page 14 of 16

Ref: D001-NV-001

Client: Essential Living

Original Date: 20th August 2017

Location of Real Time Noise Monitors

