# Memo

ATKINS
Member of the SNC-Lavalin Group

## **Project:** National Paediatric Hospital

## **Report Type:** Summary of Noise Vibration & Movement Monitoring Results

## **Period of Monitoring:** 17th February 2020 – 16th March 2020

### Introduction

Contained within the project documents for the National Children's Hospital development are requirements for Environmental Monitoring to be completed during construction works. This monitoring regime includes recording dust deposition, noise at the perimeter of the site, and ground vibration at the perimeter of the site. Permissible limits for each monitoring regime have been set out in the Project EIS which was submitted with the Planning Permission for the Hospital.

The number of Monitoring points will vary throughout the project depending on the construction works being undertaken. Additional monitoring points may be added if particular features of adjacent properties require it.

Works on site during this monitoring period include, but are not limited to:

- Steel and crane work and pouring concrete at O'Reilly Avenue/Energy Centre.
- Construction of upper levels at the hospital entrance.
- Pouring concrete and construction of upper levels near Cameron Square.
- Construction of upper level and loading areas near South Circular Road.
- Pumping concrete near Mount Brown.
- Pumping concrete near Brookfield Clinic.

### Vibration Monitoring.

Vibration monitors have been located at the 'closest part of sensitive property' as per the Project Environmental Impact Statement where feasible or alternatively at the site hoarding. The monitors will be located as per the above adjacent to locations where significant works are ongoing on site.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established vibration limit at structures depending on their condition and type. Please see tables below for the limits set.

*Table 11.7: Allowable vibration during construction phase for soundly constructed buildings*

| Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of | | |
|---|---|---|
| **Less than 10Hz** | **10 to 50Hz** | **50 to 100Hz (and above)** |
| 15 mm/s | 20 mm/s | 50 mm/s |

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*Table 11.8: Allowable vibration during construction phase for sensitive buildings*

| Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of | | |
|---|---|---|
| **Less than 10Hz** | **10 to 50Hz** | **50 to 100Hz (and above)** |
| 3 mm/s | 3 – 8 mm/s | 8 – 10 mm/s |

Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at a vibration limit of 3mm/s PPV which corresponds to the lowest permissible vibration limit for sensitive structures. Any vibration level recorded below Red levels is acceptable within the limits established in Planning.

## Number of Monitors on Site:

During the monitoring period summarised for this report (17th February 2020 – 16th March 2020) there were up to 16 active vibration monitors installed at the perimeter of the site.

## Location of Vibration and Noise Monitors:

The layout of the monitors is as seen below:


Location of Vibration Monitors

There are concentrations of monitors at the boundaries with Cameron Square and O'Reilly Avenue where works have been ongoing on site in proximity to neighbouring properties.

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Location of Noise Monitors near O'Reilly Avenue

**Observations:**

Executive Summary:

Vibration monitors have been placed at the 'closest part of the sensitive properties' as per the EIS where this is feasible. The majority of vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. Vibration monitors V1, V13, V18, V19, V20 A1 & A2 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 11 monitors:

- 1 monitors recorded readings above the limit specified within the Project EIS.
- 1 monitors were offline during the timeframe covered in this report.

Detailed Summary:

**Sensor (V2 – 3666) (James' Walk)**

- Monitor was offline continuously for the duration covered by this report.

**Sensor (V3 – 8995) (South Circular Road)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V5 – 5037) (Cameron Square)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V6 - 5044) (Cameron Square)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V7 - 5017) (Old Kilmainham Road)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V8 - 5035) (Brookfield Clinic**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V9 – 5056) (O'Reilly Avenue)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V10 – 4183) (O'Reilly Avenue)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V11 – 8988) (O'Reilly Avenue)**

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following dates: 29th February 2020. The cause was reported as an "accidental knocks".

**Sensor (V12 – 5043) (O'Reilly Avenue)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

**Sensor (V14 - 3835) (South Circular Road) (formerly numbered 5056)**

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

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## Noise Monitoring.

During the report period noise monitors have been placed at the 'closest part of sensitive property' as per the Project EIS where this has been feasible, or alternatively to the outside face of the site hoarding. When works are ongoing the noise monitor sensors run continuously, and readings are recorded in decibels (dB) $LA_{eq1hr}$. Decibels is the standard unit of measurement of sound energy and '$LA_{eq1hr}$' means that sensors record all levels of sound over a 1 hour period and then calculate an average equivalent decibel level as if the sound was continuous. Isolated instantaneous loud noises are thus averaged out.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established a noise limit at residential dwellings of 70dB $LA_{eq1hr}$. Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at the noise limit set out in the project EIS (70 dB $LA_{eq1hr}$.). Any noise level recorded below Red levels is acceptable within the limits established in Planning.

## Number of Noise Monitors on Site:

During the monitoring period (17th February 2020 – 16th March 2020) summarised for this report there were up to 16 active monitors at the site boundaries.

## Observations:

Executive Summary:

Noise monitors 07, 08, 15, 16, 17, 18, 19 & 20 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 12 monitors:

- 6 number monitors recorded readings above the limit specified within the Project EIS.
- 2 monitor recorded readings above the DCC daily 10 hour limit.
- 2 monitors were offline during the timeframe covered in this report.

Detailed Summary:

The monitoring results for noise for this period were within the limits set out in the Project EIS with the following exceptions:

**Monitor 01 (Cameron Square)**

- All noise readings recorded noise levels below the limit specified within the Project EIS.

**Monitor 02 (O'Reilly Avenue)**

- All noise readings recorded noise levels below the limit specified within the Project EIS.

**Monitor 03 (Mace)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 19th, 26th and 28th February 2020 and 11th and 12th March 2020.
- The noise report states the cause of these readings was*: "ambient traffic noise.*"

**Monitor 04 (Mount Brown Road)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th & 29th February 2020 and 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th & 16th March 2020.
- The noise report states the cause of these readings was*: "ambient noise [&] works on the ESB substation"*"
- Noise levels in excess of the 75dB DCC daily 10 hour limit were recorded on the following dates: 19th, 20th, 25th, 27th and 28th February 2020. The value of the exceedances were between 75-76 dB $LA_{eq10hr}$. The noise reports states that this reading was caused due to ambient traffic noise. No mitigation was included in the report.

**Monitor 05 (O'Reilly Avenue)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 19th February 2020.
- The noise reports states that there were "[rebar] maintenance works".

**Monitor 06 (O'Reilly Avenue)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 18th, 26th & 27th February 2020.
- The noise reports states that there were "[rebar] maintenance works".

**Monitor 09 (James' Walk)**

- The monitor deinstalled on the 9th October 2019 and has been offline continuously until the end of the timeframe covered in this report.

**Monitor 10 (Brookfield Clinic)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 19th February 2020.
- The noise reports states that there were "on this date in particular COD were completing groundworks".

**Monitor 11 (Cameron Square)**

- All noise readings recorded noise levels below the limit specified within the Project EIS.

**Monitor 12 (Cameron Square)**

- All noise readings recorded noise levels below the limit specified within the Project EIS.

**Monitor 13 (Cameron Square)**

- All noise readings recorded noise levels below the limit specified within the Project EIS.

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**Monitor 14 (South Circular Road)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th & 29th February 2020 and 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th & 16th March 2020.
- The monitor has been offline continuously since the end for the 11th February 2020 – 23rd February 2020.
- The noise report states the cause of these readings was*: "ambient noise.*"
- Noise levels in excess of the 75dB DCC daily 10 hour limit were recorded on the following dates: 17th, 18th, 20th, 25th and 27th February 2020 and 3rd, 6th, 9th, 10th and 11th March 2020. The value of the exceedances were between 75-77dB $LA_{eq10hr}$. The noise reports states that this reading was caused due to ambient traffic noise. No mitigation was included in the report.