Memo

ATKINS
Member of the SNC-Lavalin Group

Project: National Paediatric Hospital

Report Type: Summary of Noise Vibration & Movement Monitoring Results

Period of Monitoring: 26th of November – 31st of December

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:

- Piling works and Excavation of Material from site at O'Reilly Avenue/Energy Centre.
- Pile works and Excavation from site at the hospital.
- Steel works and Excavation of Material from site near Cameron Square.
- Construction of basement level 2 and excavation works at South Circular Road.
- Excavation Works at Mount Brown.
- Steel works and Excavation works at 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

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 (26th November 2018 – 31st December 2018) 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.

Memo

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, 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:

- 3 number monitors recorded readings above the limit specified within the Project EIS.
- 4 number monitors were offline for portions of the monitoring period and are noted below.

Detailed Summary:

Sensor (V2 – 9750) (James' Walk)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline on the following date: 29th and 30th December 2018.

Sensor (V3 – 8838) (South Circular Road)

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

Sensor (V5 – 9155) (Cameron Square)

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

Sensor (V6 - 9736) (Cameron Square)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline on the following date: 25th, 28th, 29th and 30th December 2018.

Memo

Sensor (V7 - 9734) (Old Kilmainham Road)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline on the following date: 11th, 12th, 13th, 14th, 15th and 16th December 2018.
- This sensor was previously name 9141 and changed to 9734 on the 11th December 2018.

Sensor (V8 - 3485) (Brookfield Clinic)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 12th, 13th and 20th December 2018.
- The vibration report states the cause of these readings was *"an accidental knock".*

Sensor (V9 – 8995) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 1st December 2018.
- The vibration report states the cause of these readings was *"an accidental knock".*
- No data provided between 17th-30th December.

Sensor (V10 – 9141) (O'Reilly Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline on the following date: 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th 29th and 30th December 2018.
- This sensor was previously name 8939 and changed to 9141 on the 14th December 2018.

Sensor (V11 – 8983) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 8th and 15th December 2018.
- The vibration report states the cause of these readings was *"an accidental knock".*

Sensor (V12 3252) (O'Reilly Avenue)

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

Sensor (V14 - 9737) (Mount Shannon)

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

Memo

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 (26th November 2018 – 31st December 2018) summarised for this report there were up to 16 active monitors at the site boundaries.

Observations:

Executive Summary:

Noise monitors 07, 08, 15 & 16 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:

- 8 number monitors recorded readings above the limit specified within the Project EIS.
- 4 number monitors were offline for portions of the monitoring period and are noted below.

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)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 27th November 2018 and 3rd, 4th, 20th, 21st and 29th December 2018.
- The noise report states the cause of these readings was *"Anchoring in Operation", "tracked excavator operating in the area", "Storm Diana", "Breaking of Guide Wall" or "Ambient Traffic".*

Monitor 02 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline on the following date: 29th and 30th December 2018.

Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 26th, 27th, 28th, 29th and 30th November 2018 and 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th and 30th December 2018.
- The noise report states the cause of these readings was *"Ambient Traffic".*

Memo

Monitor 04 (Mount Brown Road)

- The background noise readings for this sensor outside of construction hours are consistently above the normal limit of 70 dB LA_{eq1hr}. As of 2017 an alternate limit of 80 dB LA_{eq1hr} has been chosen for this location.
- Noise levels above the alternate limit of 80 dB LA_{eq1hr} were recorded on the following dates: 29th December 2018.
- The sensor was offline on the following date: 17th, 25th, 26th, 27th, 28th and 29th December 2018.
- The noise report states the cause of these readings was *"Ambient Traffic".*

Monitor 05 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates; 26th and 27th November 2018.
- The noise report states the cause of these readings was *"Pilling Rig Operation" or "Tracked Excavator and Generator in Operation".*

Monitor 06 (O'Reilly Avenue)

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

Monitor 09 (86 James' Walk)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 27th, 28th, 29th and 30th November 2018 and 1st, 2nd, 3rd, 6th, 7th, 8th, 9th, 11th, 13th, 15th, 17th, 18th, 20th, 21st and 29th December 2018.
- The noise report states the cause of these readings was *"Ambient Traffic".*

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 3rd, 4th, 12th, 13th, 14th, 18th, 19th and 20th December 2018.
- The sensor was offline on the following date: 28th, 29th and 30th December 2018.
- The noise report states the cause of these readings was *"Breaking of Concrete", "Preparation for Piling", "Piling Works" or "Dismantling & Reassembling of Hoarding".*

Monitor 11 (Cameron Square)

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

Monitor 12 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 4th, 11th, 12th and 20th December 2018.
- The noise report states the cause of these readings was *"Anchoring" or "Excavation Works".*

Monitor 13 (O'Reilly Avenue)

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

Monitor 14 (Mount Shannon Road)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 26th, 27th, 28th, 29th and 30th November 2018 and 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th and 25th December 2018.

Memo

- The sensor was offline of the following dates: 5th, 24th, 25th, 26th, 27th, 28th, 29th and 30th December 2018.
- The noise report states the cause of these readings was *"Ambient Traffic".*