

Memo

Project: National Paediatric Hospital

Report Type: Summary of Noise and Vibration Monitoring Results

Period of Monitoring: Sensor data 2nd April 2018 – 7th May 2018

Introduction

Contained within the project documents for the National Paediatric 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:

- Construction works for the Utility Tunnel at the Energy Centre.
- Excavation and pile capping near the hospital entrance and South Circular Road.
- Excavation and piling near Cameron Square.
- Road construction and pile cropping near Brookfield Clinic.
- Pile cropping and piling near Linear Park.

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

Memo

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 (2nd April 2018 – 7th May 2018) there were up to 15 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 10 monitors:

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

Detailed Summary:

Sensor (V2 – 9144 (previously numbered 9750)) (Rialto Luas)

- Vibration sensor was offline on the following dates: 2nd, 3rd, 4th, 5th April 2018 and was reported as having connection issues. The sensor was replaced on 6th April and provided readings for the remaining monitoring period.
- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V3 – 8838 (previously numbered 9155)) (South Circular Road)

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

Memo

Sensor (V5 - 3182) (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.

Sensor (V7 - 8681) (Mount Brown)

- Vibrations above the limit specified within the Project EIS were recorded on the following dates: 6th, 17th & 27th April 2018 and 1st May 2018.
Works on site in this area on 6th April include works for the Utility Tunnel at the Energy Centre and excavation and piling near Cameron Square.
On 17th April trigger readings above the limit specified in the Project EIS were investigated and it has been reported that the sensor unit had become detached from its support. It was re-attached and continued monitoring for the remaining monitoring period.
On 27th April and 1st May piling works in the area resulted in individual isolated triggers. Readings before and after the trigger on each day were below the limit specified within the Project EIS.

Sensor (V8 - 3485) (Brookfield Clinic)

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

Sensor (V10 – 8943 (previously numbered 8995)) (O'Reilly Avenue)

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

Sensor (V11 – 8983) (O'Reilly Avenue)

- Data for Vibration sensor V11 is not available: 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd April 2018.
- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V12 (previously numbered V4) - 3252) (O'Reilly Avenue)

- Vibration sensor was offline and reported as having communication issues on the following dates: 2nd, 3rd, 4th, 5th, 6th, 7th, 8th April.
- 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 (2nd April 2018 – 7th May 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.
- 1 number monitor was 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: 12th, 23rd, 24th & 25th April 2018 and 1st, 2nd & 3rd May 2018. The highest noise recording was 75 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*caused by piling operations*".

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 28th & 30th April 2018. The highest noise recording was 74 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were caused by "*on site construction activities at the utility tunnel*".

Monitor 03 (South Circular Road)

- Reading from Noise Monitor 03 were recorded until the 9th April 2018. This sensor was then moved towards Mountshannon Road and renamed as Monitor 14.

Memo

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 4, 5, 6 April 2018. The highest noise recording was 73 dB LA_{eq1hr}.

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}. All noise readings recorded levels below an alternate limit of 80 dB LA_{eq1hr}.

Monitor 05 (O'Reilly Avenue)

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

Monitor 06 (O'Reilly Avenue)

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

Monitor 09 (Rialto LUAS)

- Breach 2nd, 3rd, 4th, 5th, 6th, 7th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 23rd, 24th, 25th, 26th, 27th, 29th & 30th April 2018 and 1st, 2nd, 3rd, 4th & 5th May 2018. The highest noise recording was 81 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*caused by pile capping at Linear Park and ambient noise from the Luas operations*".

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 3rd, 4th, 5th, 6th, 9th, 10th, 12th, 18th, 19th, 20th, 23rd, 24th, 27th & 28th April 2018 and 1st & 2nd May 2018. The highest noise recording was 79 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*caused by pile cropping*".

Monitor 11 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 4th & 5th April 2018. The highest noise recording was 75 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*piling operations*".

Monitor 12 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 3rd, 4th, 5th, 6th, 10th, 11th & 12th April 2018. The highest noise recording was larger than 80 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*piling operations. Acoustic quilts were installed at the hoarding to dampen the noise levels*".

Memo

Monitor 13 (O'Reilly Avenue)

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

Monitor 14 (Mount Shannon Road)

- This is a new monitor which began recording noise readings on the 9th April 2018 replacing Monitor 03.
- Noise sensor was offline on the following dates: 14th, 15th, 20th, 21st, 22nd, 28th, 29th & 30th April 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 9th, 10th, 11th, 12th, 16th, 18th, 19th, 24th, 25th, 26th & 27th April 2018 and 1st, 2nd, 3rd, 4th & 5th May 2018. The highest noise recording was larger than 80 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were "*pile capping activities and traffic on [the] South Circular Road*".