Memo

Project: National Paediatric Hospital

Report Type: Summary of Noise and Vibration Monitoring Results

Period of Monitoring: Sensor data 7th May 2018 – 4th June 2018

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:

- Construction works for the Utility Tunnel O'Reilly Avenue and the Energy Centre.
- Excavation and pile capping near the hospital entrance and South Circular Road.
- Piling and pile cropping near Cameron Square.
- 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

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 (7th May 2018 – 4th June 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.

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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. The site was closed on the 7th of May 2018 due to the bank holiday.

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:

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

Detailed Summary:

Sensor (V2 – 9144) (Rialto Luas)

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

Sensor (V3 – 8838) (South Circular Road)

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

Sensor (V5 – 9155 (previously numbered 3182)) (Cameron Square)

- The battery of this unit died on 7th of May 2018 and wasn't replaced until the 14th May 2018.
- 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)

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

Sensor (V8 - 3485) (Brookfield Clinic)

- Vibrations above the limit specified within the project EIS were recorded on the 11th of May 2018. There was pile cropping near the location of the sensor on the day which may be the cause of the reading.

Sensor (V9 - 9244)

- Sensor is shown on map but is not present in the results.

Sensor (V10 – 8943) (O'Reilly Avenue)

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

Sensor (V11 – 8983) (O'Reilly Avenue)

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

Sensor (V12 3252) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the 28th of May 2018.
- The vibration report states the cause of these readings as "*caused by an accidental hit."*

Sensor (V14 - 9737) (Mount Shannon)

- 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 (7th May 2018 – 4th June 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:

- 6 number monitors recorded readings above the limit specified within the Project EIS.
- 3 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)

- Sensor was offline on the following dates: 1st June 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 14th, 15th, 17th, 22nd, 23rd, 24th, 30th & 31st of May 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were the construction of a retaining wall and piling activities.

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 2nd of June 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}. An alternate limit of 80 dB LA_{eq1hr} was chosen for this location.
- All noise readings recorded noise levels below the alternate limit chosen for this location.

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)

- Noise levels above those specified in the project EIS were recorded on the 8th, 9th,11th,14th , 16th ,17th, 18th, 21st, 22nd, 23rd, 24th, 25th, 28th, 29th, 30th May 2018 and on the 1st of June 2018. The highest noise recording was 75 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 and deliveries to the hospital"*.

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 9th, 10th, 11th, 14th of May 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise reports state the cause of the readings were *"caused by pile cropping"* and *"hoarding construction"*.

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: 16th, 17th, 18th, 21st, 23rd, 25th & 30th of May 2018. The highest noise recording was 78 dB LA_{eq1hr}.
- The noise reports state the cause of the readings were *"construction of the retaining wall behind Cameron Square"* and *"excavating material from around the piles".*

Monitor 13 (O'Reilly Avenue)

- This sensor was offline on the following dates: 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st May 2018. The cause of the outage was down to communication errors from the sensor.

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

Monitor 14 (Mount Shannon Road)

- This sensor was offline on the following dates: 14th, 15th, 16th, 17th, 18th, May 2018. Noise levels above the limit specified within the Project EIS were recorded on the following dates: 8th, 10th, 11th, 22th, 23rd, 24th, 25th, 26th ,28th ,29th, 30th & 31st of May 2018 and on the 1st & 2nd of June 2018. The highest noise recording was larger than 82 dB LA_{eq1hr}.
- The noise reports states the cause of the readings were pile capping activities, excavation activities and traffic on the South Circular Road.