

# Memo

**Project:** National Paediatric Hospital

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

**Period of Monitoring:** Sensor data 3<sup>rd</sup> September 2018 – 1<sup>st</sup> October 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:

- Demolition of old utility tunnel and excavating material from site at O’Reilly Avenue/Energy Centre.
- Excavation of materials from site and construction of basement slab at the hospital.
- Steel works for capping beam and excavation of material from site near Cameron Square.
- Construction of basement slab at South Circular Road.
- Construction works on new entrance at Mount Brown.

## 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 (3<sup>rd</sup> September 2018 – 1<sup>st</sup> October 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:

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

### Detailed Summary:

#### **Sensor (V2 – 9750) (Rialto Luas)**

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 22<sup>nd</sup> September 2018.
- The sensor was offline of the following dates: 10<sup>th</sup> & 11<sup>th</sup> September 2018.
- The vibration reports states that this reading was caused by an accidental knock as no works were present.

#### **Sensor (V3 – 8838) (South Circular Road)**

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 4<sup>th</sup>, 18<sup>th</sup>, 27<sup>th</sup> September 2018.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> September 2018.
- The vibration reports states that these readings where caused by an accidental knock

# Memo

## Sensor (V5 – 9155) (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 5<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> September 2018.

## Sensor (V6 - 9736) (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup> September 2018.

## Sensor (V7 - 8681) (Old Kilmainham Road)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 20<sup>th</sup> September 2018
- The sensor was offline of the following dates: 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> and 13<sup>th</sup> September 2018.
- The vibration reports states that the breach was caused by an accidental knock.

## Sensor (V8 - 3485) (Brookfield Clinic)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup> September 2018.

## Sensor (V9 – 8995) (O'Reilly Avenue)

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

## Sensor (V10 – 8939) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 4<sup>th</sup> September 2018
- The vibration reports states that the breach was caused by an accidental knock.

## Sensor (V11 – 8983) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 25<sup>th</sup> September 2018
- The vibration reports states that the breach was caused by an accidental knock.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> September 2018.

## Sensor (V12 3252) (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup> September 2018.

# Memo

## Sensor (V14 - 9737) (Mount Shannon)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> September 2018.

# 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<sub>eq1hr</sub>. Decibels is the standard unit of measurement of sound energy and 'LA<sub>eq1hr</sub>' 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<sub>eq1hr</sub>. 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<sub>eq1hr</sub>). 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 (3<sup>rd</sup> September 2018 – 1<sup>st</sup> October 2018) summarised for this report there were up to 15 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 11 monitors:

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

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 24<sup>th</sup> and 25<sup>th</sup> September 2018.

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

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup> September 2018.

#### **Monitor 03 (Mace)**

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>, 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 26<sup>th</sup>, 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup>, 30<sup>th</sup> September 2018. The highest noise recording was 80 dB LA<sub>eq1hr</sub>.
- The noise reports states that the breaches was caused by Ambient Traffic or High Winds.

# Memo

## Monitor 04 (Mount Brown Road)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup> September 2018.

## Monitor 05 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup> September 2018.

## 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 the limit specified within the Project EIS were recorded on the following dates: 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 26<sup>th</sup>, September 2018. The highest noise recording was 77 dB LA<sub>eq1hr</sub>.
- The noise reports states that the breach was caused by Ambient Luas Noise or High Winds.

## Monitor 10 (Brookfield Clinic)

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

## 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: 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup> September 2018. The highest noise recording was 77 dB LA<sub>eq1hr</sub>.
- The noise reports states that the breach was caused by construction of the capping beam.

## 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: 3<sup>rd</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup>, 25<sup>th</sup>, 26<sup>th</sup>, 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup> September 2018. The highest noise recording was 77 dB LA<sub>eq1hr</sub>.
- The noise reports states that the breach was caused by Ambient Traffic Noise or High Winds.
- The sensor was offline of the following dates: 4<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>, 23<sup>rd</sup>, 24<sup>th</sup> September 2018.