Memo

Project: National Paediatric Hospital

Report Type: Summary of Noise and Vibration Monitoring Results

Period of Monitoring: Sensor data 29th January 2018 – 18th March 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: the pouring of concrete walls, columns and slabs near O'Reilly Avenue, excavation and piling works near the hospital entrance, Cameron Square, South Circular Road & Brookfield Clinic and pile cropping and capping 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 (29th January 2018 – 18th March 2018) there were up to 18 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 & Noise 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 Vibration & Noise Monitors around O'Reilly Avenue

Observations:

Executive Summary:

The majority of vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. However six number monitors recorded readings above the limit specified within the Project EIS. Vibration monitors have been placed at the 'closest part of the sensitive properties' as per the EIS where this is feasible.

7 number monitors were offline for portions of the monitoring period and are noted below.

Detailed Summary:

Sensor (V3 – 9155, previously numbered 9000) (South Circular Road)

- The sensor was offline on the following dates: 8, 9, 10, 11, 12, 13, 14 February 2018.
- All vibration readings recorded below the limit specified within the Project EIS.

Sensor (V9 - 9244) (O'Reilly Avenue)

- Monitor was disconnected from 8th February and moved to suit work activities as part of ongoing review of vibration monitoring plan.
- All vibration readings recorded up to this date were below the limit specified within the Project EIS.

Sensor (V7 - 8681) (Mount Brown)

- Readings were recorded above the limit specified within the Project EIS on the following dates: 16, February 2018 & 04, 08, 10, 14 March 2018.
- The vibration reports that some of the breaches occurred by the monitor being knocked on site. The contractor advised that containment and services were fixed to hoarding at this location without the monitor being moved. The contractor believes this accounts for the vast majority of readings. According to the report, the largest breach is 5.5mm/s which was caused by piling works on site.

Sensor (V13- 9141) (Hospital A&E)

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

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Sensor (V11 – 8983, previously called 8898) (O'Reilly Avenue)

- Monitor 8898 disconnected on 8th February and was replaced by monitor 8983 on 12th February. All vibration readings recorded by sensors 8893 & 8898 were below the limit specified within the Project EIS.

Sensor (V5 - 3182) (Cameron Square)

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

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Sensor (V10 - 8995) (O'Reilly Avenue)

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

Sensor (V12 - 3468) (O'Reilly Avenue)

- 1 readings was recorded marginally above the limit specified within the Project EIS on the following dates: 30 January 2018.
- The vibration report notes this breach was caused by being knocked on site by a bag.

Sensor (V14 - 9737) (4 Mount Shannon Road)

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

Sensor (V2 - 9750) (Rialto Luas)

- This sensor had a connection error on 26th February 2018 to 18 March 2018 inclusive.
- All vibration readings recorded up to this date were below the limit specified within the Project EIS.
- Sensor 9005 (below) is in the vicinity of this sensor and gives readings for this area.

Sensor (V1 - 9734) (Hospital Entrance)

- 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 (Temp - 9005) (Luas Comm Box)

- Readings were recorded above the limit specified within the Project EIS on the following dates: 06, 09, 15 February 2018.
- All three readings were below the limit set out in the Project EIS for soundly constructed buildings.

- The vibration report states that these breaches were the result of *"Luas operations and excavation works"*.

Sensor (V4 - 3252) (Cameron Square)

- The sensor was offline on the following dates: 15, 16, 17 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 12, 13 March 2018.
- The vibration report states that the breaches were due *to "the new resident of the property undertaking renovations to the property in the vicinity of the vibration unit. After disturbing the vibration monitor the new residents removed the sensor so the instrument would not get damaged."*
- It has been advised that the resident is building an extension and has requested that the vibration unit is removed altogether.

Sensor (A2 - 8939) (Pharmacy (inside))

- This sensor is located inside the Pharmacy. Sensor 9734 is located on the outside of the same building and is therefore closer to the construction works. Sensor 8939 is regularly disrupted by St. James' Hospital staff. Construction works would be expected to cause more triggers for 9734 (as it is closer to the works) but it does not. It seems correct to say sensor 8939 is affected by staff rather than construction works.

Sensor (A1 – 8621, previously named 9044) (A&E (inside))

- Sensor 9044 disconnected on 05/02/2018 and was replaced by sensor 8621 on 21/2/2018.
- All vibration readings recorded once the sensor was online were below the limit specified within the Project EIS.

Sensor (V18 – 3187 (previously numbered 8838) (Energy Centre)

- The sensor was offline on the following dates: 8, 9, 10, 11, 12, 13, 14 February 2018.
- All vibration readings recorded below the limit specified within the Project EIS.

Sensor (V8 - 3485) (Brookfield Clinic)

- Two readings were recorded marginally above the limit specified within the Project EIS on the following dates: 31 January 2018 & 09 March 2018.
- The vibration report states that the breaches were the result excavation works and had a magnitude of 5.5mm/s

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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 (29th January 2018 – 18th March 2018) summarised for this report there were up to 15 active monitors at the site boundaries.

Observations:

Executive Summary:

Fourteen of the fifteen monitors recorded noise levels above the limits set out in the Project EIS, these are 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 15 and 16.

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)

- Readings were recorded above the limit specified within the Project EIS on the following dates: 29 January 2018, 02, 05, 06, 07, 08, 09, 15, 16, 19, 20, 21, 22, 23, 27, 28 February 2018 & 05, 06, 07 March 2018.
- The noise readings of the triggers varies between 70-75dB LA_{eq1hr} with one trigger of 81dB LA_{eq1hr}.
- The noise report states that excavation and pilling works are the cause of the triggers.

Monitor 02 (O'Reilly Avenue)

- The sensor was offline on the following dates: 5, 6, 14 & 18 March 2018.
- All noise readings recorded noise levels below the limit specified within the Project EIS

Monitor 03 (South Circular Road)

- Readings were recorded above the limit specified within the Project EIS on the following dates: 29, 30, 31 January 2018, 05, 06, 19, 20, 21, 22, 23 & 27 February 2018 & 05, 06, 07, 08, 09, 12, 13, 14 & 16 March 2018.
- The values of the triggers range from 70-85dB LA_{eq1hr}.The noise report states that excavation and piling works are the causes of these triggers.

Monitor 04 (Mount Brown Road)

- The sensor was offline on the following date: 18 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 29, 30, 31 January 2018, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12,13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 February 2018 & 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16 & 17 March 2018.
- The values of the triggers range from 70-80dB LA_{eq1hr}.The noise report states that ambient traffic noise is the cause of these triggers. It is advised that there is very limited work occurring in direct proximity to 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 07 (Hospital A&E)

- The sensor was offline on the following dates: 04, 18 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 14, 15, 16 March 2018
- The values of the triggers range from 75-85dB LA_{eq1hr}.The noise report states that excavation works near the hospital are the cause of these triggers.

Monitor 08 (Pharmacy)

- The sensor was offline on the following dates: 03, 04, 09, 10, 11 February 2018 & 02, 03, 04, 07, 12, 13, 14, 17, 18 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 29, 30, 31 January 2018, 01, 02, 07, 08, 12, 13, 14, 15, 19, 26, 27, February 2018 & 05, 06, 08, 09 & 16 March 2018
- The values of the triggers range from 70-80dB LA_{eq1hr}.The noise report states that excavation works near and deliveries to the hospital are the causes of these triggers.

Monitor 09 (Rialto LUAS)

- The sensor was offline on the following dates: 14, 22, 26, February 2018 & 01, 02, 03, 04, 14, 18 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 29, 30, 31 January 2018, 01, 02, 05, 06, 07, 08, 09, 10, 12, 13, 15, 16, 19, 20, 21, 23, 27 February 2018 & 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16 & 17 March 2018.
- The values of the triggers range from 70-85dB LA_{eq1hr}.The noise report states that excavation works and ambient traffic noise from the LUAS are the causes of these triggers.

Monitor 10 (Brookfield Clinic)

- The sensor was offline on the following date: 18 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 19 February 2018 & 05, 07, 08, 09, 12, 13, 14, 15 & 16 March 2018.
- The values of the triggers range from 70-75dB LA_{eq1hr}.The noise report states that excavation works are the cause of these triggers.

Monitor 11 (Cameron Square)

- The sensor was offline on the following dates: 08, 09, 10 & 11 February 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 31 January 2018, 01, 02, 05, 06, 07, 12, 13, 14, 19, 20, 21, 22, 23, 26 & 27 February 2018 & 05, 08, 12, 13, 14 & 15 March 2018.
- The values of the triggers range from 70-78dB LA_{eq1hr}.The noise report states that excavation & piling works are the causes of these triggers

Monitor 12 (Cameron Square)

- The sensor was offline on the following dates: 07, 12, 13 & 14 March 2018.
- Readings were recorded above the limit specified within the Project EIS on the following dates: 31 January 2018, 07, 12, 13, 21, 22, 26 & 27 February 2018 & 15, 16 March 2018.
- The values of the triggers range from 70-82dB LA_{eq1hr}.The noise report states that excavation & piling works are the causes of these triggers

Monitor 13 (O'Reilly Avenue)

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

Monitor 15 (A&E Office)

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

Monitor 16 (Cardiac Ward)

- Readings were recorded above the limit specified within the Project EIS on the following dates: 29 January 2018 & 07 March 2018.
- The values of the triggers range from 70-75dB LA_{eq1hr}.The noise report states that ambient noise is the cause of these triggers.