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ATKINS
Member of the SNC-Lavalin Group

Project: National Paediatric Hospital

Report Type: Summary of Noise Vibration & Movement Monitoring Results

Period of Monitoring: 29th of October – 26th of November

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 new road at the hospital.
- Steel works for capping bean and excavation of material from site near Cameron Square.
- Construction of basement slab and excavation works at South Circular Road.
- Excavation Works 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

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 October 2018 – 26th November 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 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. 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 13 monitors:

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

Detailed Summary:

Sensor (V2 – 9750) (Rialto Luas)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 3rd November 2018.

Sensor (V3 – 8838) (South Circular Road)

- The sensor was offline of the following dates: 14th and 16th November 2018.
- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V5 – 9155) (Cameron Square No.27)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 25th November 2018.

Sensor (V6 - 9736) (Cameron Square No.23)

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

Sensor (V7 - 9141) (Old Kilmainham Road)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 19th November 2018.
- The vibration report states the cause of these readings was *"an accidental knock".* The magnitude of the vibration (200mm/s) is indicative of a local knock.

Sensor (V8 - 3485) (Brookfield Clinic)

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

Sensor (V9 – 8995) (O'Reilly Avenue)

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

Sensor (V10 – 8939) (O'Reilly Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 16th November 2018.

Sensor (V11 – 8983) (O'Reilly Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 7th November 2018.

Sensor (V12 3252) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 11th November 2018.
- The vibration occurred outside of working hours and reached a magnitude of 3.1mm/s.

Sensor (V14 - 9737) (Mount Shannon)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was offline of the following dates: 2nd and 28th October 2018.

Sensor (V19 - 8681) (McDowell Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was discontinued on the 12th November 2018 due to the completion of works in the area on the 8th November 2018.

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Sensor (V20 - 8898) (CRIC's car park)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.
- The sensor was discontinued on the 12th November 2018 due to the completion of works in the area on the 8th November 2018.

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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 October 2018 – 26th November 2018) summarised for this report there were up to 18 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 14 monitors:

- 11 number monitors recorded readings above the limit specified within the Project EIS.
- 6 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: 31st, 5th, 6th, 7th, and 12th of November 2018.
- The noise report states the cause of these readings was *"excavation works".*

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates; 7th November 2018.
- The sensor was offline of the following dates: 2nd, 7th, 8th, 9th, 11th, 12th and 16th November 2018.
- The noise report states "*this breach was caused by two personnel completing works at the back of the hoarding beside this monitor. The breach only lasted momentarily".*

Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 29th, 30th, 31st October 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 November 2018.
- The noise report states the cause of these readings was *"ambient traffic noise".* This is possible as readings are above the limit specified within the Project EIS on working and non-working days.

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 limit specified within the Project EIS were recorded on the following dates: 2nd November 2018.
- The sensor was offline on the following date: 29th, 30th, 31st October 2018 and 1st, 2nd, 3rd, 4th, 5th, 11th, 12th, 13th and 14th of November 2018.
- The noise report states the cause of these readings was *"ambient traffic noise".*

Monitor 05 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates; 7th, 20th, 21st and 23rd November 2018.
- The noise report states the cause of these readings was *"piling rig and tracked excavators".*

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: 31st October 2018 and 3rd, 6th, 7th, 9th and 14th November 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The sensor was offline of the following dates: 29th, 30th October 2018 and 5th, 6th, 7th, 8th, 9th, 13th, 14th, 18th and 19th November 2018.
- The noise report states the cause of these readings was *"ambient traffic noise".*

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 7th November 2018.
- The noise report states the cause of these readings was *"excavation works".*

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: 30th and 31st October 2018 and 1st, 2nd, 5th, 6th and 8th November 2018.
- The noise report states the cause of these readings was *"anchoring"* or *"maintenance of new anchors".*

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: 30th and 31st October 2018 and 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 November 2018.
- The sensor was offline of the following dates: 29th, 30th October 2018 and 1st, 2nd, 13th and 15th November 2018.
- The noise report states the cause of these readings was *"ambient traffic".* This is possible as readings are above the limit specified within the Project EIS on working and non-working days.

Monitor 17 (1 McDowell Av)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 30th October 2018 and 1st, 2nd, 3rd, 4th, 5th, 6th, 8th and 9th November 2018.
- The noise report states the cause of these readings was *"ambient traffic".*
- The sensor was offline of the following dates: 29th and 30th October 2018 and 7th, 8th and 11th November 2018.
- The sensor was discontinued on the 12th November 2018 due to the completion of works in the area on the 8th November 2018.

Monitor 18 (CRIC's car park)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 30th and 31st October 2018 and 1st, 2nd, 5th, 6th, 7th, 8th and 9th November 2018.
- The noise report states the cause of these readings was *"ambient traffic", "demolition works", "maintenance works"* or *"cars coming to / from carpark".*
- The sensor was offline of the following dates: 30th and 31st October 2018 and 10th and 11th, November 2018.
- The sensor was discontinued on the 12th November 2018 due to the completion of works in the area on the 8th November 2018.