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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: 24th June – 11th August

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:

- Steel and excavation work and road compaction at O'Reilly Avenue/Energy Centre.
- Concrete pouring, steel works and excavation of materials at the hospital entrance.
- Pouring concrete, basement construction and excavation works near Cameron Square.
- Construction of basement & multi-level and excavation works near South Circular Road.
- Pouring concrete and excavation near Mount Brown.
- Excavation, steel works, pouring concrete and depositing material near Brookfield Clinic.

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 (24th June 2019 – 11th August 2019) 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.

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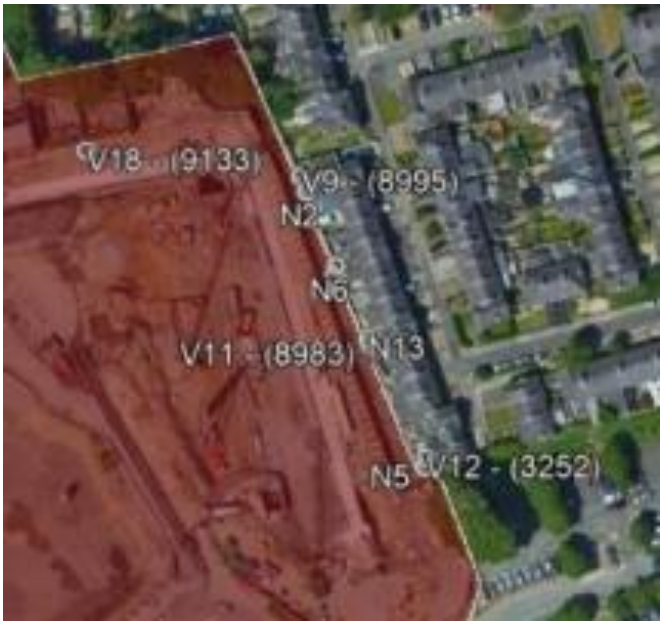

Location of Noise Monitors near O'Reilly Avenue

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 11 monitors:

- 3 monitors recorded readings above the limit specified within the Project EIS.
- 0 monitor was offline during the timeframe covered in this report.

Detailed Summary:

Sensor (V2 – 3835) (James' Walk)

- 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) (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 - 9734) (Old Kilmainham Road)

- Vibrations above the limit specified within the Project EIS were recorded on the following dates: 29th July 2019.
- The vibration report states the cause of these vibrations was *"accidental knocks".*

Sensor (V8 - 3485) (Brookfield Clinic)

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

Sensor (V9 – 8995) (O'Reilly Avenue)

- Vibrations above the limit specified within the Project EIS were recorded on the following dates: 6th August 2019.
- The vibration report states the cause of these vibrations was *"accidental knocks".*

Sensor (V10 – 4183) (O'Reilly Avenue)

- Vibrations above the limit specified within the Project EIS were recorded on the following dates: 9th July 2019 and 3rd & 7th August 2019.
- The vibration report states the cause of these vibrations was *"accidental knocks".*

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)

- 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.

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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 (24th June 2019 – 11th August 2019) 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:

- 9 number monitors recorded readings above the limit specified within the Project EIS.
- 2 monitor recorded readings above the DCC daily 10 hour limit.
- 3 monitor was offline during the timeframe covered in this report.

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: 24th, 25th 26th 27th, 28th & 29th June 2019, 1st, 2nd, 3rd, 4th, 5th, 9th, 10th, 11th,12th, 15th, 16th, 17th, 18th, 19th, 22nd, 25th, 26th, 29th, 31st, July 2019 & 1st, 2nd, 3rd, 7th, 8th, 9th & 10th August 2019.
- The noise report states the cause of these readings was*: "steelworks being completed and a concrete pour.*"
- Noise levels in excess of the 75dB DCC daily 10 hour limit were recorded on the following dates: 10th July 2019, the noise report states the cause of this breach was *"concrete pumping activity...and an abundance of concrete trucks"*.

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 7th August 2019.
- The noise report states the cause of these readings was the erection of hoarding.
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Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 28th June 2019, 22nd July 2019 & 7th, 8th & 9th August 2019.
- The noise report states the cause of these readings was*: "ambient noise.*"
- The monitors were offline for multiple hours on: 2nd & 3rd August 2019.

Monitor 04 (Mount Brown Road)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 24th, 25th 26th 27th, 28th 29th & 30th June 2019, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th,12th, 13th, 14th 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st July 2019 & 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th & 11th August 2019.
- The noise report states the cause of these readings was*: "ambient noise.*"

Monitor 05 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 30th July 2019.
- The noise report states the cause of these readings was*:" ambient noise.* "
- The monitors were offline for multiple hours on: 24th & 25th June 2019.

Monitor 06 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The monitors were offline for multiple hours on: 24th & 25th June 2019.

Monitor 09 (86 James' Walk)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 2nd July 2019.
- The noise report states the cause of these readings was*:" ambient noise.* "

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 24th & 28th June 2019, 3rd, 8th, 9th, 10th, 11th, 17th, 18th, 25th & 26th July 2019 & 1st, 2nd, 8th & 9th August 2019.
- The noise report states the causes of these readings were trucks passing near the monitor and the pouring and pumping of concrete.

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: 24th June 2019, 3rd, 17th, 25th, 26th, 27th, 29th & 30th & 31st July 2019 & 1st, 2nd, 3rd, 6th, 7th, 8th, 9th & 10th August 2019.
- The noise report states the causes of these readings were steel tying and concrete pouring near the monitor.
- Noise levels in excess of the 75dB DCC daily 10 hour limit were recorded on the following dates: 9th August 2019, the noise report states the cause of this breach was *"Due to steel*

being tied...a generator running...rebar…being transported ... [and] operatives utilising consaws and drills nearby the monitor".

Monitor 13 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- The monitors were offline for multiple hours on: 24th & 25th June 2019.

Monitor 14 (Mount Shannon Road)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 24th, 25th, 26th, 27th, 28th & 29th June 2019, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th,12th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 30th & 31st July 2019 & 2nd, 4th, 6th, 7th, 8th, 9th, 10th & 11th August 2019.
- The noise report states the cause of these readings was*:" ambient noise.* "