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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: 01st March 2021 – 29th March 2021

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 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 features of adjacent properties require it.

Works on site during this monitoring period include, but are not limited to:

O'Reilly Avenue/ Energy centre – Construction of upper levels; Loading Bay, Deliveries, Waste skip removal and removal of excavation materials. Mobile crane and piling rig operational.
Hospital – Construction of upper levels, Interior works. Concrete works, loading bay area, FM tunnel preparations. Waste removal. Façade works.
Cameron Square – Concrete works.
South Circular Road – Construction of upper levels, Interior works. Steel works, concrete works, HGV Loading bay. Scaffolding loading
Mount Brown – Waste removal, deliveries and ground works.
Brookfield Clinic – Concrete pump operational.
Energy Centre – Ground works and façade stone works.

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 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 Noise and Vibration Monitors

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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.

Location of Noise and Vibration 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. Most vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. Vibration monitors V1, V13, V18, V19, V20, 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:

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

Detailed Summary:

Sensor (V2 – 3666) (James' Walk)

- The vibration unit V2 located at James's Walk no. 86 was de-installed on the 9th October 2019 after the house owner requested it.

Sensor (V3 – 8995) (South Circular Road)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on 19.03.2021. Cause: "knock to the monitor from the homeowner". Mitigation: None.

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Sensor (V5 – 5037) (Cameron Square)

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

Sensor (V6 - 5044) (Cameron Square)

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

Sensor (V7 - 5017) (Old Kilmainham Road)

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

Sensor (V8 - 5035) (Brookfield Clinic

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

Sensor (V9 – 5056) (O'Reilly Avenue)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following days:
    - 19.03.2021. Cause: "knock to the monitor from the homeowner". Mitigation: None.
    - 20.03.2021. Cause: "knock to the monitor from the homeowner". Mitigation: None.
    - 21.03.2021. Cause: "knock to the monitor from the homeowner". Mitigation: None.
    - 22.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.
    - 23.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.
    - 25.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.
    - 26.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.
    - 27.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.
    - 28.03.2021. Cause: "knock to the monitor from the homeowner [due to a rat infestation]". Mitigation: None.

Sensor (V10 – 4183) (O'Reilly Avenue)

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

Sensor (V11 – 8988) (O'Reilly Avenue)

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

Sensor (V12 – 5043) (O'Reilly Avenue)

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

Sensor (V14 - 3835) (South Circular Road) (formerly numbered 5056)

- 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 summarised for this report there were up to 20 active monitors at the site boundaries.

Observations:

Executive Summary:

Noise monitors 07, 08, 15, 16, 17, 18, 19 & 20 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:

- 10 number monitors recorded readings above the limit specified within the Project EIS.
- 2 number monitors were offline for at least 1 day during the timeframe covered by 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 23rd March 2021: Mitigation measures had been implemented to the area where noise was originating - acoustic blankets were in place on the area hoarding and the concrete pump was positioned in a timber housing at all times which reduced noise being omitted. These have since been removed as the concrete pump has been taken out and will not be used in the area again.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on 19th, 20th, 21st, 22nd, 23rd and 27th March 2021: The peak noise exceedance was 81.8dB LAeq1hr. The noise report stated the reason for the exceedances was construction works including the use of concrete pumps and nearby idling concrete trucks. ORA has a double hoarding separating it from the site which acts as a sound barrier. Vehicles do not idle in the area

unless they are needed for immediate work while traffic is aimed to be kept to a minimum. Increased efforts have been made in this area to reduce noise with a wall of acoustic blankets recently erected in anticipation for upcoming tunnel work. These have been very effective with regards to noise suppression.

All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded on the 1st – 6th March 2021 inclusive and 8th- 28th March 2021 inclusive. The noise report stated that the exceedances were caused by ambient traffic noises along the South Circular Road. Exceedances were noted on weekends and bank holidays when there was no construction on site.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 04 (Mount Brown Road)

- Noise levels above the limit specified within the Project EIS were recorded on: 1st, 2nd, 3rd, 4th, 5th, 6th and 7th March 2021. The noise report stated that the exceedances were caused by ambient traffic noises along the R810 road. Exceedances were noted on weekends and bank holidays when there was no construction on site.
- The monitor went offline on the 7th and did not come back online for the timeline covered by this report. The report notes “the unit had a communication issue. Whilst it was recording the data, it was not able to send it.”
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 05 (O’Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on: 16th, 18th, 19th, 20th, 22nd and 23rd March 2021. The noise report stated the reason for the exceedances was construction works including the removal of waste from site and nearby idling concrete trucks. ORA has a double hoarding separating it from the site which acts as a sound barrier. Vehicles do not idle in the area unless they are needed for immediate work while traffic is aimed to be kept to a minimum. Increased efforts have been made in this area to reduce noise with a wall of acoustic blankets recently erected in anticipation for upcoming tunnel work. These have been very effective with regards to noise suppression.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 06 (O’Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 09 (James' Walk)

- The unit has been de-installed since 9th October 2020 at the house owner's request.

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on: 03rd 09th, 10th, 12th, 24thand 25th March 2021. Mitigation measures had been implemented to the area where noise was originating - acoustic blankets were in place on the area hoarding and the concrete pump was positioned in a timber housing at all times which reduced noise being omitted. These have since been removed as the concrete pump has been taken out and will not be used in the area again.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 11 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 12 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on 23rd March 2021: Mitigation measures had been implemented to the area where noise was originating - acoustic blankets were in place on the area hoarding and the concrete pump was positioned in a timber housing at all times which reduced noise being omitted. These have since been removed as the concrete pump has been taken out and will not be used in the area again.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 13 (64 O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were breached as per the table below.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 14 (South Circular Road)

- Noise levels above the limit specified within the Project EIS were recorded on the 1st – 25th March 2021 inclusive and 26th- 28th March 2021 inclusive. The noise report stated that the exceedances were caused by ambient traffic noises along the South Circular Road. Exceedances were noted on weekends and bank holidays when there was no construction on site.
- Noise levels above the limit specified within the DCC 10-hour limit were noted on the 26th March 2021. The level of the noise vale was 75.5dB.